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ON ALKALINE IODIDES AND BROMIDES.

By Ferdinand F. Mayer.

In preparing these salts, since a direct combination of the halogens with the alkaline metal is not practicable, they are usually combined with hydrogen or some less positive metal, from which the salts are then formed by being brought together with caustic or carbonated alkalies.

From the cheapness of the material, iron has most generally been selected to form the intermediate combination, various methods being employed to reduce the bulk of the precipitated oxyd, among which are that of the Dublin Pharmacopœia, and the process known as Griepenkoven's and Buchner's, which was originally suggested by Liebig.

These methods require partly caustic alkalies, and are rather circumstantial; and because the alkaline sulphates are always obtainable free from chlorides, which in the carbonates tend to deteriorate the quality of the product, Liebig has lately, in the instance of the iodides, recommended the preparation of calcium or baryum salts, by saturation with hydriodic acid, as the intermediate stage, from which pure alkaline salts are readily obtained by precipitation, partly with the sulphates, partly, and to complete the reaction, with carbonates.

The hydriodic acid used for the purpose is its mixture with phosphoric, formed by the simultaneous action of phosphorus and iodine on water, and, as we have it from the accounts of M. Pettenkofer and W. S. Squire, the process is expeditious and not at all expensive. There are, however, several objections

to its use by the pharmaceutist especially for extemporaneous application. These objections, as well as any that might be raised against iron, I believe do not apply to the methods given below, in which metallic iron is retained in its old place.

PREPARATION OF IODIDES.

The alterations which I have introduced in the preparation of the iodides, and the bromides as well, intend to remove the necessity of using caustic alkalies, and shorten the process.

The formulas are founded on the following observations:

In Griepenkoven's method, a solution of ferrous iodide is in part oxydised by the addition of iodate or hypo-iodite of the alkali, the precipitated ferric oxyd forming magnetic oxyd with the ferrous oxyd precipitated afterwards by the addition of more alkali.

On the same principle, when to a solution of iodate or hypo-iodite containing free alkali, we gradually add a solution of a ferrous salt, there is at first a precipitation of brown ferric oxyd, which by the further addition of ferrous salt changes to magnetic oxyd.

When ferrous sulphate is used for this purpose, the result is magnetic oxyd, iodide and sulphate of the alkali.

When ferrous iodide is used, there results magnetic oxyd and alkaline iodide only.

Instead of a ferrous salt, metallic iron can be used to reduce the hypo-iodite or iodate. On bringing together fine iron filings with a solution of iodine in caustic alkali, containing an excess of iodine, and especially on applying heat, the iron is peroxydised, as it would be by a solution of a hypochlorite.

To test for the presence of iodic or hypo-iodous acid, the solution was filtered through one slip of filtering paper on another, and then touched with an alkaline solution of iodide potassium starch, and a second sample merely with starch and a drop of hydrochloric acid.

When precipitated ferric oxyd is heated with excess of iron filings, water is decomposed, its oxygen forming ferrous oxyd, which with the ferric oxyd forms the denser black, magnetic oxyd, while the hydrogen it set free.—[*Woehler and Preuss.*]

If this action of metallic iron in contact with ferric oxyd

takes place in an alkaline solution of a hypo-iodite, or iodate, but little hydrogen is set free until the oxysalts have been reduced to iodides.

On adding three equivalents of iodine to two of metallic iron under water, they form a brown solution of ferric iodide. That the third equivalent of iodine is held in chemical combination is proved by the fact, that on the addition of a caustic or carbonated alkali to this solution no hypo-iodous acid is formed, but a precipitation of ferric oxyd takes place, exactly as when adding a solution of alkali to one of ferric chloride.

When to this precipitated ferric oxyd more alkali is added, and then a solution of ferrous salt or iodide, ferrous oxyd is precipitated and forms with the other the black oxyd. If lime was the alkali, ferrous sulphate will form sulphate and iodide of calcium with magnetic oxyd.

If instead of adding a ferrous salt, the brown mixture is heated with excess of iron filings, hydrogen gas is evolved and black oxyd is formed.

It has been shown above that the oxyacids of iodine are reduced during this reaction. When therefore we mix four equivalents of iodine with two of metallic iron under water, and then add four equivalents of caustic alkali, or part carbonated and part caustic alkali, there results a mixture of ferric oxyd and hypo-iodite of the alkali, and when this is heated with iron filings, the result is simply magnetic oxyd and alkaline iodide.

The action of iodine on iron and water also takes place in a solution, or in the presence of a *carbonated alkali*. The iodide of iron as it forms is at once decomposed by the carbonate; carbonic acid escapes, and oxyd of iron and iodide of the alkaline metal remain.

By adding *three* equivalents of iodine to two equivalents of iron contained in a solution of four equivalents of carbonate of the alkali, and afterwards a solution of an equivalent of ferrous iodide, the products are black oxyd, iodide of the alkaline metal, and carbonic acid, which is given off.

By adding *four* equivalents of iodine to two of iron contained in a solution of four equivalents of carbonated alkali, and afterwards two equivalents or more of iron, the result is the same, but with this advantage, that the black oxyd is less hydrated and becomes denser on boiling.

When instead of using a solution of the carbonated alkali, the latter is added to the water in crystals of the bicarbonate of potassa or carbonate of soda, the reaction takes place as before; but the heat evolved by the combination of the iodine and iron will be reabsorbed for the solution of the crystals, and thus there will be no great increase of temperature, if any.

The action of ferric iodide on carbonate of lime and of lithia is the same as the other fixed alkaline carbonates, while that of ferrous iodide is but slow and incomplete. For the formation of iodide of calcium a fourth equivalent of iodine may be added in the form of ferrous iodide, and a fourth equivalent of alkali in the form of milk of lime. In the case of salt of lithium the proportion must remain three equivalents of carbonate of lithia, three of iodine, and two of iron, the change of the ferric oxyd to be brought about afterward by boiling with iron filings.

As it is understood that the new Pharmacopœia has adopted the bicarbonate of potassa for all such purposes, I have introduced it into the formulas; but in its place the purified carbonate can be used on a larger scale, or the sulphate of potassa, to precipitate the iodide of calcium in the same manner as directed by Liebig. For iodide of sodium we require nothing better than the crystallized carbonate of soda.

Iodide of Potassium.

FIRST METHOD.

Take of Bicarbonate of Potassa	400	parts.
Iodine	508	"
Iron in filings	112	"
Water	a sufficient quantity.	

Place the bicarbonate and iodine with three times their weight of water into a flask capable of holding twice the quantity; then add one half of the iron in portions, and when all the salt is dissolved, add the remainder of the iron, shake up, and boil until the precipitate has become dense. Then test whether the solution be free from iron by applying a drop of it to the uppermost of two small slips of filtering paper, one placed above the other, and touch what has filtered on the lower slip with a drop of solution of ferrocyanide of potassium. If this produce a blue stain, a little carbonate or bicarbonate of potassa must be added

to the mixture, until the reaction is no longer produced. Then filter while hot into a porcelain dish, wash the precipitate on the filter with some hot water, add the washings to the filtered solution, and evaporate to the point of crystallization, or to dryness when the salt is to be granulated by stirring after crystallization has begun.

SECOND METHOD.

Take of	Bicarbonate of Potassa	400 parts.
	Iodine	508 "
	Iron in filings	112 "
	Water	a sufficient quantity.

Place the bicarbonate of potassa, with three-fourths of the iodine, and one half of the iron and sufficient water, into a flask or porcelain dish, and stir up until the salt is dissolved. In the mean time prepare in another glass vessel a solution of iodide of iron from the remainder of the iodine and iron and sufficient water: add this, sediment and solution, to the alkaline mixture, stir, boil up, test, and proceed as above.

[The latter method seems preferable for larger quantities; the resulting iodide of potassium should come within a trifle of the calculated amount.]

Iodide of Sodium.

Take of	crystallized Carbonate of Soda,	572 parts
	Iodine,	508 "
	Iron,	112 "
	Water,	a sufficient quantity.

Proceed precisely as above. There is generally a slight excess of carbonate of soda, owing to the efflorescence of the crystals, which is remedied by the addition of a small quantity of iodine or iodide of iron in solution. The filtered solution is best evaporated to dryness and granulated, on account of the deliquescent properties of the salt.

Iodide of Lithium.

Take of	Carbonate of Lithia,	112 parts
	Iodine,	381 "
	Iron in filings,	112 "
	Water,	a sufficient quantity.

Place the carbonate of lithia, rubbed fine, together with the

iodine, one half of the iron, and sufficient water, into a flask, and when all the iodine and lithia are dissolved, add the remainder of the iron, boil up, and proceed as directed for *Iodide of Sodium.*

Iodide of Calcium.

Take of Precipitated Carbonate of Lime, 200 parts.
Iodine, 381 "
Iron in filings, 112 "
Water, a sufficient quantity,

and proceed as directed for iodide of lithium.

From the iodide of calcium, or, if need be, iodide of baryum prepared in the same manner, all the other iodides are prepared by precipitation with the sulphates or carbonates of their respective metals.

[The carbonate of lime, which is added in excess and does therefore not all dissolve, must be free from chloride and magnesia. It is then preferable to burnt lime in the form of milk, as this is rarely free from the latter impurity. The coloration of these iodides when evaporated appears to be owing to the presence of iodide of magnesium, which is decomposed during that operation.]

Preparation of Bromides.

The action of bromine on caustic and carbonated alkalies, together with ferrous salts or metallic iron, is in every respect analogous to that of iodine. The proportions for the various salts, which are prepared precisely in the manner directed for the iodides, are as follows:

[*Bromide of Potassium.*

Take of Bicarbonate of Potassa, 400 parts.
Bromine, 320 "
Iron in filings, 112 "
Water, a sufficient quantity.

Bromide of Sodium.

Take of Crystallized Carbonate of Soda, 572 parts.
Bromine, 320 "
Iron in filings, 112 "
Water, a sufficient quantity.

Bromide of Lithium.

Take of	Carbonate of Lithia,	112 parts.
	Bromine,	240 "
	Iron in filings,	112 "
	Water,	q. s.

Bromide of Calcium.

Take of	Precipitated Carbonate of Lime,	200 parts.
	Bromine,	240 "
	Iron in filings,	112 "
	Water,	a sufficient quantity.

New York, June 9, 1862.

ON SULPHATE OF ANILIN.

By William Procter, Jr.

The attention which has of late been given to the new dyes from coal tar products has developed much information on the subject of anilin, but the great pecuniary value which is placed on this information, in view of its use in the production of dyes, has prevented much of it from reaching the journals. At the last meeting of the British Association, Dr. Turnbull, of Liverpool, called attention to the sulphate of anilin as a therapeutic agent, and his short notice was transferred to page 62 of the present volume of this journal. Having been applied to for information regarding this salt, the following notice has been prepared with a view of satisfying it in a measure.

In the continuations of the elaborate paper of M. E. Kopp, on the preparation of artificial coloring matters from coal tar, published in this journal for 1861, will be found his directions for its extraction from coal tar, and its artificial preparation from benzole, also a product of coal tar. See this journal, March, 1861, pages 129 and 131. The separation of anilin from coal tar direct is a very complex troublesome process, but when derived from benzole, although a tedious process, requiring considerable skill, yet it is by no means so troublesome. If the benzole is nearly pure, nitro-benzole is easily produced by causing small streams of strong nitric acid and benzole to meet in a funnel tube which passes through a vessel of cold water, so as to

moderate the reaction. The resulting liquid should be washed first with water, then with a weak solution of carbonate of soda, and finally with water. I have found no difficulty in making it on a small scale by simply pouring slowly the two ingredients through a small glass funnel, passing through a cork into a precipitating glass without any refrigeration, except that caused by contact with the vessel. The benzole used was obtained from Atwood & Co., Waltham, Mass., but benzole sufficiently pure for this use is now made in Philadelphia. As, however, nitrobenzole is an article of commerce under the name of essence de mirbane, or artificial oil of bitter almonds, it will probably be more easy to commence with this substance, which is transformed into anilin by several processes.

Preparation of Anilin.—Anilin is prepared from nitrobenzole, 1st, by the action of sulphide of ammonium, on its alcoholic solution; 2d, by the action of nascent hydrogen when it is put in a vessel containing diluted sulphuric or muriatic acid and zinc, whereby that gas is slowly generated, gradually producing anilin, which combines with the excess of acid, and a resinous matter. The liquid thus obtained is saturated with caustic soda and distilled, when anilin and water are condensed. On trying this process it proved slow and troublesome and wasteful. 3d. Wöhler's process by the action of a hot alkaline solution of arsenious acid, the nitrobenzole being dropped in slowly, at once yields anilin, which distills over; when by precipitating it with oxalic acid and washing with alcohol, a pure oxalate results. 4th. The process of Béchamp (Annal. de Chim. et de Phys. serie 3d, xlii. p. 186,) by distilling together nitrobenzole, iron filings, and acetic acid, is suggested as the most eligible one for the pharmaceutist, with the proper precaution of using good materials and having thorough refrigeration to insure the rapid condensation of the vapors.

Take of Nitrobenzole, ...	1000 grains.
Iron filings, ...	1200 "
Concentrated Acetic acid, .	1000 "

Put the iron filings and nitro-benzole into a quart tubulated retort, adapt it to a receiver, and connect the receiver by a bent tube with a deep small-necked flask, into which it reaches nearly to the bottom. Having well refrigerated the neck of the retort,

the receiver and the flask, the last to be left loosely stopped with cotton, the acetic acid is poured in through the tubulure, which should be closed and tied. Reaction soon commences without the application of heat and becomes rapid, with quick rise of temperature and rapid ebullition, and a large portion of the products will be lost should the refrigeration be imperfect. The spontaneous distillate consists of anilin, acetate of anilin, and a little undecomposed nitro-benzole. When the retort has cooled these are returned to it from the receiver, and a careful sand bath heat applied until the residue in the retort is dry.

The distillate is now mixed with an excess of a solution of caustic potassa, when the hydrated anilin is separated and rises to the surface, whence it is to be removed and dried. It is sufficiently pure for medical purposes and yields a soft mass of crystals when mixed with sulphuric or muriatic acid, which dissolve in water. By this method, Béchamp states that in several trials he obtained as much anilin as equalled three-fourths of the nitro-benzole employed, and at a cost (in 1855) of two dollars a pound. (Chem. Gaz. vol. 13th, page 85.)

Anilin when pure is a colorless, thin oily liquid, but as usually seen in commerce has a more or less red color, sometimes as dark as bromine, arising from oxidation in part, and also from impurities. Its odor is peculiar; when pure not disagreeable, but often modified by other products so as to remind one of coal oil. Its density is stated as variously as 1·20 and 1·28. Its taste is acrid and pungent; it is but slightly soluble in water and does not crystallize at 4° below zero, F. It boils at 360° F. and distills unchanged. It is a powerful base, forming salts with a strong tendency to crystallize. Its basic power enables it to decompose the salts of iron, zinc, alumina, &c., like ammonia. It does not change the color of reddened litmus, or reddened turmeric, but changes dahlia blue to green. It oxidizes easily even under water, turning yellow, and then reddish, becoming resinous. It is easily characterized by instantly striking a deep violet blue by contact with chlorinated lime or other hypochlorites. It exerts no poisonous action on dogs. Eight grains introduced with a drachm and a half of water into the stomach of a rabbit caused strong clonic cramps, then labo-

rious breathing, loss of strength, dilated pupils, and inflammation of the mucous membrane of the mouth. Dropped into the eye it does not dilate the pupil. (Hoffman in Gmelin's Handbook, vol. xi. p. 249.)

Preparation of Sulphate of Anilin.—Having obtained anilin by the foregoing or any other process, the sulphate is easily prepared by several processes.

Take of Anilin, as pure as possible, 500 grains.
Sulphuric acid, 250 "
Distilled water, 4 fluid ounces.

Mix the acid with the water, add the anilin and agitate them together until a thick magma is formed and the odor of anilin has nearly disappeared. This is now washed with strong alcohol until free acid and coloring matter is removed; then, having pressed the drained salt between the folds of white filtering paper, it is dried in the dark. If wanted in crystals, the white pulverulent sulphate thus obtained is dissolved in boiling alcohol, which is allowed to cool slowly in a covered vessel in a dark place; the crystals, when formed, should be drained on filtering paper and dried in the dark.

The sulphate may also be made by dissolving the anilin in two fluid ounces of alcohol, 95 per cent., then having mixed the sulphuric acid slowly with two fluid ounces of the same liquid, when cool add it to the solution of anilin. The sulphate thus formed is washed with cold, strong alcohol, pressed in bibulous paper, and dried in the dark.

Sulphate of anilin is an odorless, colorless crystalline salt when entirely pure, but when exposed to air and light, especially if moist, it changes color from the formation of fuscine, the odor of anilin being also apparent. The crystals may be dried at 212° without decomposition except a slight change of color, but at a higher temperature they lose first water and then anilin, and an acid salt remains, which on being yet further heated is decomposed, producing sulphite of anilin, ammonia and odorin, with a residue of carbonaceous matter. When a grain of the sulphate is put in 14 grains of water in a test tube, and repeatedly shaken for an hour, a slight residue remains undissolved, indicating that water at 60° dissolves about 6 per cent. Absolute alcohol, cold, dissolves it but slightly, but at

the boiling temperature quite freely. Diluted alcohol is a better solvent; ether does not dissolve it at all. Water saturated at 212° solidifies on cooling. Its formula is $C_{12}\,NH_8\,O, SO_3+HO$.

Dr. Genth, of Philadelphia, who has recently turned his attention to the preparation of the anilin dyes, showed me a fine sample of the pure sulphate, which, if a demand should occur, can be furnished at three dollars an ounce, wholesale, at the Laboratory of Messrs. Andreykovicz and Poizat, 112 Arch street, Philadelphia.

ON SYRUP OF IODIDE OF IRON.

By Dr. W. H. Pile.

To the Editor of the American Journal of Pharmacy.

Dear Sir,—The sample of Liquor Ferri Iodidi I send with this note, has been exposed to the air in a wide-mouthed vial for several weeks, with no other apparent change than an increased density, arising from loss of water by evaporation.

As I had previously been unable to prevent this article, as made by the usual formula, from losing its fine green color and becoming brown, when opened and exposed for even a very short time, I give you the method of its preparation, that you may judge whether the heat employed would be objectionable in any point of view.

℞.	Iodine	℥ij.
	Iron filings	℥j.
	Sugar	℥xvi.
	Water	q. s.

Mix the iodine with four ounces of distilled water in a porcelain vessel, and gradually add the iron, stirring constantly, and avoiding much increase of temperature. When the liquid acquires a light greenish color, filter it into a boiling syrup made from the 16 ounces of sugar with 6 ounces of distilled water. When the solution has all passed, pour two ounces more distilled water gradually upon the filter; continue the boiling a few minutes longer, and lastly, when cold, add distilled water until the whole measures 20 fluid ounces.

Note by the Editor. The formula suggested by Dr. Pile is like that adopted in the Pharmacopœia of 1860, which is nearly as follows:

Take of	Iodine	two troy ounces,
	Iron filings	one " "
	Simple syrup	sixteen fluid ounces, or q. s.
	Distilled water	a sufficient quantity.

Mix the iodine with three fluid ounces of water in a glass flask, and gradually add the iron filings, with agitation, and shake until all the iodine has combined. Place the syrup in a capsule, heat it to the boiling point, and filter into it the concentrated solution of iodide of iron, then having washed the filter with a little boiling distilled water, complete the measure of 20 fluid ounces if necessary with simple syrup and mix.

ON ANEMONE LUDOVICIANA.

By Adolph W. Miller.

(An Inaugural Essay presented to the Philadelphia College of Pharmacy.)

Polyandria Polygynia, Linnæus.

Ranunculaceæ, Jussieu.

Scape 1-flowered, involucrate, involucrum softly lanuginous, subulately divided; leaves digitate, multifid, upper surface smooth, segments entire, linear, acute; petals 6, oblong-ovate, erect.—*Nuttall.*

The above plant, which Nuttall states to be found near the confluence of the Missouri and Platte rivers, and thence west to the Rocky Mountains, is also met with in considerable abundance in the State of Minnesota, especially on the dry, sandy bluffs forming the bed of the Mississippi.

The large, cup-shaped flowers are of a pale, purple hue, and appear before the leaves almost immediately after the melting of the snow has shown that the long and dreary winter of the North is approaching its close. Hence these blossoms are eagerly sought for as the first offerings of the long desired spring.

The many points of similitude between this plant and the European Anemone Pulsatilla, which were also noticed by Nuttall, very naturally gave origin to the supposition, that in chemical composition, and therapeutical effects they were also closely allied, if not synonymous. Numerous experiments, instituted by Dr. W. H. Miller, of St. Paul, Minnesota, with a view of verifying the latter surmise, proved to be entirely successful, and also served to establish the value of this remedy in

many chronic diseases of the eye, particularly cataract, amaurosis and opacity of the cornea. Very decided advantage was also experienced from its employment in cutaneous eruptions, and in secondary syphilis. These results, in conjunction with the investigation of its chemical constituents, are believed to be sufficient to warrant the substitution of this indigenous plant for the European Anemone pulsatilla, which, though not often administered by regular practitioners, is very frequently resorted to by the Homœopathists.

A tea of the dried flowers and herb was sometimes employed, as well as the juice of the fresh plant bruised and expressed, and then either preserved by the addition of one-fourth of its bulk of alcohol, or evaporated to the consistence of an extract. In preparing the latter, the presence of some volatile acrid principle was clearly manifested by the highly irritating vapors arising from the juice on the application of a gentle heat, producing a very painful impression on the eyes of the operator. That this volatile substance is also dissipated by drying is proved by the taste of the dry flowers, which is simply sweetish and herbaceous, that of the leaves being more astringent with very slight acrimony, while in the recent state both are exceedingly irritating and acrid. The odor of the dried plant is rather faint, being very slightly camphoraceous.

As the preserved juice had not been subjected to the deteriorating influence of evaporation, it was supposed to contain the greatest amount of active principle. It was therefore most frequently administered, and the most marked effects of the drug were observed to follow from its use.

A portion of this, which had been prepared during the previous year, was first examined in lieu of the fresh plant, which it was not possible to obtain in the vicinity of this city. By standing, the juice had been separated into a clear, dark brown liquid, and an earth-like deposit, occupying about ⅓ of the whole bulk. After having been well shaken, two ounces were mixed with four ounces of 95 per cent alcohol, and set at rest for two days. The mixture was then filtered, and the filtrate allowed to evaporate slowly to a small bulk of reddish brown syrup, soluble without residue in two drachms of distilled water. Even the smallest quantity gave a very decided indication of grape

sugar, with liquor potassæ and sulphate of copper. Sesquichloride of iron produced the deep greenish black color characteristic of tannic acid. A small proportion of gallic acid was also ascertained to be present.

The residue which had been left on the filter was removed and triturated with ether, thrown on a filter and washed with ether. The evaporation of this ethereal solution yielded a very small amount of oily resinous matter, which did not leave a greasy stain on heated paper, but rather made the spot more brittle and rougher than it was previously.

The portion insoluble in alcohol and ether was then treated with water, forming a dark brown solution, which was evaporated to a syrupy consistence having a black color. This gave yellowish brown precipitates with acetate and subacetate of lead, but none with subacetate after the action of neutral acetate. It was evaporated to three grains of a dark brown, brittle, shining, extractive matter, insoluble in hot alcohol, and but partially soluble in water.

Experiments were next made upon the dry flowers, and the seeds which happened to have been gathered with them. By a comparison of weights in the recent and in the dried state, it was found that by exsiccation 1000 parts had become reduced to 114·29, showing a loss of about 85 per cent. They were divided as finely as possible by a cutting knife, their villous and lanuginous character precluding other modes of comminution. 1000 grains were then digested with 7 ounces of 95 per cent alcohol, expressed after four hours, and twice consecutively subjected to the same process. The tincture gave with sesquichloride of iron, a greenish black color; with solution of sulphate of quinia, a white precipitate; with solution of gelatin, a dense, white, flocculent deposit, indicative of tannic acid. Boiled with sulphate of copper and liquor potassæ, a large amount of suboxide of copper was thrown down by the grape sugar present. The mixed alcoholic tinctures on evaporation left a greenish brown resin weighing 110 grains, and a small amount of light green wax-like matter clinging to the sides of the vessel.

As the resin did not appear to be strictly homogeneous, it was washed with successive portions of ether as long as any color was communicated to that solvent; by this operation all the

waxy matter was removed, and obtained separately on the evaporation of its ethereal solution. The resin insoluble in ether was of a firm consistence, dark brown color, weighing 104 grains.

After the flowers had been treated with alcohol for the third time, they were dried, and found to weigh 870 grains, having lost 13 per cent of alcoholic extract. They were then covered with water and digested in a steam bath for two hours. The expressed liquid gave dense precipitates with acetate and subacetate of lead used successively, thereby showing the presence of gum and allied bodies.

120 grains of the flowers finely cut up were then arranged in a percolator and exhausted with ether. After the menstruum had evaporated spontaneously, there was left a greenish resinous fluid. On the application of heat this separated into a hard resin, disposed to cohere and form small lumps, which could easily be removed mechanically, and a small amount of fluid, light colored, translucent, oily matter, possessing a very acrid and almost caustic taste. This was volatilized at a more elevated temperature, producing a very irritating pungent vapor, affecting the eyes and causing sneezing. The hard resin was also possessed of a peculiar taste, though it differed essentially from that of the other; it was found to be insoluble in strong alcohol.

The flowers, after being treated with ether, were displaced with strong alcohol, as long as any color was imparted to the menstruum. The evaporation of this liquid yielded a resin insoluble in ether, analogous to that which had been obtained from the first lot of flowers, besides several drops of a brown, ropy solution, which, judging from its taste, appeared to contain, simply grape sugar.

When the same flowers, already extracted by ether and alcohol, were exhausted with cold water, and this evaporated, a brittle, brown extractive matter was procured, having but little taste and odor. The residue of these operations was treated with strong sulphuric acid, being completely charred and made miscible with water.

An alcoholic extract prepared from a fresh portion of the flowers according to the directions of several of the Pharmaco-

pœias of Germany, had a sweetish, astringent taste and a reddish brown color, very closely resembling in all its physical properties a specimen of the genuine European Extractum Pulsatillæ, obtained from Mr. F. L. John.

An aqueous extract presented nearly the same appearance, but differed in consistence, being much softer, and also in taste, evidently containing a large proportion of grape sugar.

An examination of the dry leaves was then instituted. A cold infusion was prepared by macerating 250 grains in 6 ounces of water for twenty hours, and expressing. It was of a clear, reddish-brown color, herbaceous taste and odor. After standing for a short time, a precipitate appeared, which was removed by filtration. Grape sugar and tannic acid were easily detected, but no traces of vegetable albumen could be found. Acetate of lead threw down much gummy matter.

The same leaves were subsequently digested with a hot solution of carbonate of soda and strained. A light-colored, yellowish gelatinous mass was precipitated from this by dilute sulphuric acid. On cooling, the liquid itself was observed to gelatinize, showing the presence of some compound of the pectin series.

Two thousand grains of the bruised leaves of Anemone ludoviciana were placed in the still of a Beindorff's apparatus, and steam was passed through them, until three pints of distilled liquid had been condensed. This became slightly opalescent on standing, depositing on the sides of the vessel a very thin film of camphoraceous matter. It had an acid reaction on litmus paper, but not in any very marked degree.

Another portion of one thousand grains of the leaves was then placed in the still after the former contents had been removed, and was subjected to cohobation with the liquid previously obtained. The properties of this distillate were analogous to those of the first, but recognized more readily. The peculiar taste and camphoraceous odor were very perceptible, the acid reaction on litmus paper stronger. A very thin iridescent film was observed floating on the surface.

The liquid was then placed in an air-tight vessel, and suffered to remain at rest for twenty days in a cool cellar. At the expiration of this time, traces of a whitish deposit were observed,

but in so minute a quantity that they could not be separated by mechanical means. The distillate was therefore strongly agitated with half a fluidounce of chloroform and this separated. The chloroform was rapidly evaporated in a current of dry air, and yielded a trifling amount of a whitish substance. This had a peculiar, very acrid taste and a well marked camphoraceous odor; it was volatile at ordinary temperatures.

It was believed that this substance was nearly pure anemonin, and that the acid reaction of the distillate was due to anemonic acid, both of which could doubtless be obtained in much greater amount from the green plant. This conclusion seemed the more probable and justifiable when the abundance of acrid and irritating vapors was taken into consideration, which were given off in evaporating the juice of the fresh herb to an extract, this having been prepared by the writer in former years with great personal inconvenience on that account. The European authorities also agree in the statement, that they were unable to isolate anemonin from the dry herbs of Anemone pratensis and nigricans. This agrees very nearly with the results obtained by the distillation of the dry leaves of Anemone ludoviciana, mere traces of the active volatile principle, yet enough to demonstrate its existence.

The alcoholic extract of the leaves, of which ten drachms were obtained from six ounces with the application of heat, or about twenty per cent, presented a shining deep green color, showing the amount of chlorophylle contained in the herb. The odor of this extract was herbaceous, the taste peculiar, astringent and disagreeable.

Inorganic Constituents.—Six ounces of the leaves having been extracted with boiling alcohol, were incinerated in an open vessel. A light-colored ash resulted, which was found to weigh 162 grains. This was lixiviated with boiling water and filtered. The lye gave a white precipitate with nitrate of silver, which was entirely soluble in liquor ammoniæ, showing the presence of a chloride. A white precipitate was also produced by chloride of barium, not wholly soluble in nitric acid, indicating a sulphate.

When a concentrated solution of tartaric acid was added to the alkaline liquid, carbonic acid was liberated with efferves-

cence, and the mixture after being agitated and set at rest, deposited white crystals of bitartarate of potassa. Since no trace of yellow color could be detected in the flame of the blow-pipe when directed on the salts remaining after the expulsion of water from the lye, but only a delicate purple tinge, the presence of potassium was inferred in the following combinations: sulphate and carbonate of potassa, and chloride of potassium.

After the lye had been oxidized with nitric acid, a blue color was produced on the addition of ferrocyanide of potassium, while previous to oxidation the blue color was not formed immediately with that test, proving the existence of a protosalt of iron.

The insoluble portion of the ash was treated with dilute nitric acid, much carbonic acid being evolved. The filtered solution gave a dense white precipitate with binoxalate of ammonia, indicative of carbonate of lime. Magnesia was detected by white gelatinous precipitates with liquor potassæ, liquor ammoniæ and carb. of potassa.

PHARMACEUTICAL NOTES.

By James T. Shinn.

Acetate of Potassa.—On account of the deliquescence of this salt, it is difficult to keep in the dry state, and as it is usually prescribed in liquid form, I have found it very convenient to have on hand a solution of definite strength. The crystallized salt consists of acetic acid 51, potassa 47·2, water 18, so that for every 116·2 parts of acetate we require 47·2 of potassa, or 69·2 of carbonate, the latter being the cheapest form for use. For 8 ounces of acetate of potassa we decompose (116·2 : 69·2 : : 8 : 4·76) 4¾ ounces of carbonate of potassa or salt of tartar, with sufficient acetic acid. Every one hundred grains of officinal acid s. g. 1·041 requires sixty grains bicarbonate of potassa, or (100·2 : 69·2 : : 60 : 41·43) 41·43 grains of the carbonate to neutralize it, so that 4¾ ounces of carbonate of potassa need about (41·43 : 100 : : 4·75 : 11·46) eleven and a half ounces by weight of the U. S. P. acid. Therefore to make a solution containing one-half acetate of potassa,

Take of Carbonate of potassa 4 ounces 6 drachms,
Acetic acid 11½ ounces or sufficient.

Add the acid gradually to the carbonate of potassa until effervescence ceases, and the liquid is neutral to test paper; add water enough to make a pint of solution, and filter. The commercial acid is generally a little stronger than the officinal,* ranging up to 1·044, consequently less than eleven ounces and a half will be required.

This solution keeps a long time unchanged, and every fluid drachm containing half a drachm of acetate potassa, is very readily *weighed* by *measure*, and answers for most prescriptions calling for the salt in solution. Every apothecary can make it himself with but little trouble, and at one-third the cost of the dry article; if the latter is needed, a small portion may be quickly evaporated in a porcelain capsule on a water-bath.

Compound Infusion of Gentian.—This infusion is frequently ordered by physicians in Philadelphia, and when made officinally, spoils too soon to keep on hand in quantity, while to prepare it whenever prescribed, often takes longer than is convenient, even if the immediate percolation process of Grahame is employed. A concentrated tincture, which will remain unchanged, containing such a proportion of alcohol, that when diluted with the requisite quantity of water, the mixture will agree with the formula of the Pharmacopœia, obviates the difficulty completely. Such a one is made as follows:

Take of Gentian, in powder, two ounces,
Orange peel, "
Coriander, " each half an ounce.
Diluted alcohol, sufficient.

Make a pint of tincture by percolation. For compound infusion of gentian, add four fluid ounces of this tincture to twelve fluid ounces of water. Thus made, it contains the proper proportion of alcohol, and is of officinal strength in gentian, orange peel and coriander, and may possibly be more effectual on account of the stronger menstruum used, while the dispenser does not detain the patient, nor have to send the medicine by his own messenger.

* The true sp. gr. of the U. S. P. Acetic Acid, according to Mr. Maisch is 1·046 and this number has been adopted for the U. S. P., 1860.—EDITOR.

REMARKS ON THE ACTIVE PRINCIPLES OF HYDRASTIS CANADENSIS.

(*In a letter from* WM. S. MERRILL & CO., *of Cincinnati, to a member of the Publishing Committee, with permission to publish.*)

We have delayed further reports to you on the proximate principles of the Hydrastis, until we could examine the subject a little further. We now report the result of our observations as follows: The Hydrastis contains two distinct alkaloids which we name *hydrastia* and *hydrastina*. The former, in its uncombined state, is very soluble, and we have not obtained it in crystalline form, but it forms beautiful yellow salts with all the acids. Of these the muriate is the least soluble and most easily obtained in beautiful feathery crystals. It is the substance which, dried and powdered, we have been selling as *hydrastine*. The sulphate is scarcely distinguishable from the muriate in appearances, and in medicine has the advantage of being more soluble in water, but for this reason is more difficultly prepared.

The hydrastia closely resembles *berberina*, the alkaline base of Berberis vulgaris, and also we think that of Xanthorrhiza apiifolia, and has been pronounced identical with it, but after a careful comparison we do not think it is so. With the purest specimens of the muriate of each which we could make, we found the behaviour with several reagents to be distinctly different. These comparative experiments we will report another time if desirable, but will not take time and space for it now.

The other base, hydrastina, when pure, is very insoluble in water, so much so that it is almost wholly tasteless. It is soluble in hot alcohol, and from that solution crystallizes in large greenish crystals, as sample sent you. It combines readily with acids, and neutralizes them, forming intensely bitter salts. These are not easily crystallized, but when dry form white amorphous powders which we have no doubt are active medicinal agents.

Some of our physicians anticipate that the pure hydrastina will prove a convenient tonic for children and fastidious patients, as, taken in aqueous fluids, it is quite tasteless, but will become active when combined with acids in the stomach.

The acid with which these bases are combined in their normal

state we have not obtained quite pure, and have not determined whether it is identical with any of the already known vegetable acids or not.

Cincinnati, May 3d, 1862.

Remarks by the Editor Amer. Jour. Pharm.: The reader's attention is directed to an Inaugural Essay, by Mr. Alfred B. Durand, at page 112, vol. xxiii. April, 1851, of this Journal: to another by Dr. Mahla, page 141, March, 1862, and a third in this number, page 360, by J. Dyson Perrins, F.C.S. of England, all on Hydrastis Canadensis, the last of which originally appeared in an abridged form in the Chemical News, (London) April 12th, but as a full paper in May, 1862, in the Pharmaceutical Journal of London. We are thus particular in noticing these papers—1st, to show that the two first must have been well known to Mr. Merrill, who, in speaking of the subject, makes no allusion to them, and reports the result of his observations to be that "hydrastis contains two distinct alkaloids which he names *hydrastia* and *hydrastina*." This sort of assumption is to be discountenanced. Mr. Durand, eleven years ago, made out the alkaline nature of hydrastia sufficiently clear; yet so modest was he, that fearing his results might not be entirely satisfactory, he says, "For the present I shall therefore call the substance *hydrastin*, with the hope that I will be more successful, after repeating my experiments on a larger scale, in fully establishing its rank among the alkaloids, and in conformity with our nomenclature change its present name of hydrastin to that of *hydrastia*." Mr. Durand's doubts of the true alkaline nature of hydrastia were that he could not obtain *crystallizable salts*, and both Mr. Perrins and Mr. Merrill agree in stating that its salts do not crystallize. Mr. Merrill says that his hydrastia [the hydrastin of the Eclectics] closely resembles berberina, the alkaline base of Berberis vulgaris, and also, he thinks, that of Xanthorrhiza apiifolia, and has been pronounced identical with it, "but after a careful comparison we do not think so," &c. In relation to this sentence we wish to remark, that no published intimation of the analogy or identity of hydrastin and berberina appeared (so far as our knowledge extends) prior to Dr. Mahla's announcement of the fact in Silliman's Journal for January, 1862. Dr. Mahla bases his opinion on an ultimate analysis—and J. Dyson Perrins corroborates his opinion. If, therefore, Mr. Merrill has just reason to doubt the correctness of Dr. Mahla and Mr. Perrins, as he says, it is but just that he should publish his experiments. If Mr. Merrill held this opinion prior to January, 1862, it is to be regretted that he did not make it known. On the other hand, it gives us pleasure to call attention to the fact that Mr. Merrill's manuscript is dated at Cincinnati, May 3d, 1862, just nineteen days after the notice of Mr. Perrins' paper in the *Chemical News*, and only three days after its full publication in the Pharmaceutical Journal, and hence that his opinion in regard to the analogy of

hydrastin (berberin) with the alkaloid in Xanthorrhiza apiifolia was probably formed prior to Mr. Perrins' announcement of that fact, although Mr. Perrins has a just claim to its discovery.

It may be asked why did not Durand notice the substance since called hydrastin by the Eclectics, which Dr. Mahla proves to be muriate of berberina? In referring to his paper it will be found that Mr. Durand considered it to be "yellow coloring matter," as when bichloride of tin was added to the alcoholic tincture, it produced "a most brilliant yellow precipitate," which was most probably muriate of berberin, with subchloride of tin. We have in possession a phial presented to us by Mr. Durand in 1851, labelled "hydrastin,"—well crystallized, of a straw yellow color; and another specimen made and presented by Mr. Edward S. Wayne, of Cincinnati, in 1856, identical in appearance and character with it, except that it is lighter in color. Last spring we examined a very beautiful crystallized specimen of Durand's hydrastia, made by Mr. Wm. S. Merrill, of Cincinnati, but which was darker colored than either Durand's or Wayne's, which may have been due to the larger size of the crystals. In conclusion we will remark, that the well defined chemical characters of the peculiar alkaloid of hydrastis, the bitterness of its salts, and the great esteem in which the plant is held by Eclectic practitioners, all point to the propriety of our physicians submitting this alkaloid to a therapeutical examination to ascertain its real merit in an isolated form. If, as Mr. Merrill suggests, its tonic power is of a kind appropriate for children, the tasteless character of the pure alkaloid, as he remarks, may be favorably seized on as a form suitable for its exhibition.

ON BAPTISIA TINCTORIA.

By Bennett L. Smedley.

(*An Inaugural Essay.*)

Wild indigo is a small perennial shrub found in all parts of the United States, growing generally in woods and dry barren soil.

The root is externally of a dark brown color: internally lightish yellow, containing a small ligneous cord, rendering it very difficult to pulverize. The stem is from two to four feet in height, much branched, and bearing a small yellow flower, and is characterized by turning of a blue color on being dried. The fruit is an oblong pod of a bluish black color.

On the application of heat to a slightly alkaline infusion of the root, I detected the presence of albumen, the existence of which was also indicated by a turbid appearance being produced

by the addition of nitric acid, and by a copious precipitate being thrown down with a solution of corrosive sublimate, after being slightly acidulated with acetic acid.

By boiling the infusion and filtering to remove the albumen, I obtained a precipitate by adding a solution of the basic acetate of lead, indicating the presence of gum.

The tincture of iodine was added to the decoction of the root, turning it of a deep blue color, which was dissipated by boiling a sufficient length of time, proving the presence of starch.

The addition of a solution of the persulphate of iron to a strong infusion, failed to detect either tannic or gallic acid. The presence of tannic acid was neither indicated by a solution of gelatin, nor by sulphate of quinia.

To a concentrated tincture made with strong alcohol, a large quantity of water was added; a yellowish resin was thrown down, two drachms and two scruples being obtained from two pounds of the root.

A quantity of the root was boiled with water acidulated with muriatic acid, and the liquor strained; to this was added, slightly in excess, a diluted milk of lime, which caused a copious precipitate; this precipitate was collected, washed repeatedly with distilled water and dried; the dried precipitate was treated with boiling alcohol, and the filtered solution evaporated, leaving an extract of a light yellowish color; this was treated with hot water slightly acidulated with sulphuric acid, agitated with animal charcoal, filtered and set aside to crystallize. This liquid had the strong disagreeable taste of the root, and yielded perfectly transparent crystals in plates, similar to those of chlorate of potassa.

On adding a slight excess of solution of ammmonia to this liquid, a white feathery precipitate was produced.*

The root employed was some collected by myself, near Media,

*The probability is great that the author has here isolated a new alkaloid, but so little interest has he manifested in the result of his investigations, that he gives us no clue to its character. He does not say whether it has an alkaline reaction, a bitter taste, or is destructible by heat. This careless, incomplete way of recording is greatly to be deprecated, and deprives those who adopt it of much of the credit otherwise due them.—Ed. Am. Journ. Pharm.

in this State, about the 1st of March, 1861, and was carefully prepared and dried.

I was unable to discover any fixed or volatile oil, the former by treating with ether, or the latter by distilling with an alkaline solution.

The above chemical examination was suggested by interrogations from an old country gentleman, who has for many years been administering both to his own family and neighbors a strong decoction of the root, as a most effectual cure in the early stages of dysentery.

Four grains of the resin, which by the Eclectics is styled baptisin, were taken by myself, attendant with no other effect than occasioning much nausea.

The medical properties of the root, I suppose to exist in the crystallizable principle obtained, and those ascribed by the Eclectics, to the resin, are mainly owing to its containing a very small portion of this principle in combination.

Phila'd. January 22d, 1862.

REMARKS ON DIALYSIS.

By William Procter, Jr.

The important subject of liquid diffusion, as developed by Prof. Thomas Graham, was laid before the readers of this Journal in a paper published at page 513, for the year 1861. Since that time, both in England and on the Continent, the importance of the facts set forth by Mr. Graham have attracted much attention, and results of great interest to physiology, chemistry and pharmacy, seem destined to flow from them. In the April number of the Pharmaceutical Journal, page 515, Prof. T. Redwood has published an elaborate lecture, illustrated with several wood cuts, in which he has gone into much detail with tabular views of the relative diffusive power of different substances. The great length of this paper precludes its publication in this Journal, and whilst referring the reader to the original, it is proposed to give such a brief sketch of the subject as will enable those not conversant with the process to get an idea of its nature and usefulness.

Liquid Diffusion is the tendency which particles of matter in solution have to move from one part of a liquid menstruum to another, even in opposition to the force of gravity, under particular circumstances.

The first arrangement suggested by Mr. Graham consists in placing a small jar, containing a solution of the substance to be diffused, in a large jar of distilled water, so carefully that the fluids be not mixed mechanically, when, on standing, the dissolved body will be found to have diffused itself into the distilled water. Whilst muriatic acid, common salt, cane sugar, and many other bodies possess this property in a strong degree, others, such as albumen, gum, etc., are found to enjoy it but slightly. Now Mr. Graham discovered that, as a general rule, crystallized bodies diffuse much more readily than amorphous substances, and hence he has called the former *Crystalloids*, and the latter *Colloids*, from *collin*, the best sort of gelatin. (See Mr. Graham's paper.)

Of the bodies heretofore tested, hydrochloric acid is the most diffusive; and assuming this body as unity, the times of equal diffusion for several substances are as follows: hydrochloric acid 1; chloride of sodium 2·33; sugar 7; sulphate of magnesia 7; albumen 49; caramel 98.

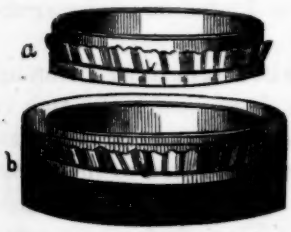
Mr. Graham considers crystallizable bodies to be in a *statical* condition, whilst the colloids are in a *dynamical* state; that is to say, the latter have a greater susceptibility to the influence of external agents, and from this cause are adapted to the transforming influences of the processes of organic life, like albumen, gelatin and fibrin of the animal body. These bodies generally form a feeble union with water, and the solid hydrates of some colloids possess a remarkable property in reference to the diffusion of other bodies. For instance, jelly of gelatin will permit crystalline matter in an aqueous solution in contact with it to diffuse or pass through or into it, whilst it will refuse a passage partially or wholly to a body of the colloid class. According to Prof. Redwood, if ten per cent of chloride of sodium be added to one part of such a jelly while rendered fluid by heat, and this having been put into the bottom of a diffusion jar, the latter be carefully filled up with seven parts of pure liquified jelly, after the first has solidified, and quickly cooled, the chloride of

sodium will, under the circumstances, diffuse out of the lower stratum into the upper, just as quickly as though the two strata were water and saline water.

Now if the lower stratum of jelly be mixed with ten per cent of vegetable extractive instead of the chloride of sodium, no diffusion will occur, that body from its colloidal nature not being able to traverse the gelatinous medium as did the salt.

Taking advantage of this fact, Mr. Graham found on trial that a very thin stratum of a gelatinous medium would prevent the diffusion of colloid bodies, and that by the use of such a septum or diaphragm, the process of separating the crystalloids from the colloids became greatly simplified. After a trial of various gelatinous tissues, parchment paper* was found in all respects the best, although paper sized with starch jelly, or gelatin, or coagulated albumen, would answer.

When the process of diffusion is thus used as a means of separating bodies by the aid of a hydrated septum, the process is called by Mr. Graham *dialysis*, the instrument a *dialyser* and the solution of the matter which passes the septum the *diffusate*, just as we use the terms filtrate and percolate as substantives.



The form of dialyser recommended by Mr. Graham, consists of a short cylinder six to ten inches in diameter, and two inches high, made of a band of gutta percha. Over one end of this a sheet of parchment paper is stretched, and tightly tied by a string, the edges of the paper being crimped around the outside of the cylinder so as to extend some distance above the string as at *a* in the figure. This part of the apparatus which is to contain the substance to be diffused, is placed within a larger glass vessel, of similar shape, about six inches deep, and capable of holding five to ten times as much, as at *b*. Into this, distilled water is poured until three-fourths full, the smaller vessel floated on it, and the liquid to be diffused then

* Parchment paper is made by simply passing ordinary white wrapping paper quickly through a cool mixture of two parts of sulphuric acid, and one of water by weight, and then washing it thoroughly till the acid is removed.

poured into the latter, when the process proceeds without further attention. In thus taking advantage of the principle of circulatory displacement, by putting the liquid to be diffused at the top instead of at the bottom of the water, the process is much facilitated, especially where the diffusible body is abundant.

Thus arranged, the apparatus is left for hours or days, according to circumstances, such as the rapidity of the process, or the tendency to decomposition by reason of the warmth of the weather or the dilution of the diffusate.

Prof. Redwood says: "It may be well to observe that parchment paper, or indeed any of the substances named above, can only be used as a septum in dialysing *aqueous* liquids. The septum is considered by Mr. Graham to owe its action to its condition, in the wetted state, as the hydrate of a colloidal substance, in which the water of hydration is held by a weak affinity, which the superior affinity exerted by a crystalloid can overcome. Hence there is dehydration taking place in one direction, and rehydration in the other direction, through the septum during its action. A septum suitable for dialysing alcoholic and ethereal solutions remains to be discovered. Some form of collodion may possibly answer the purpose."

The following results of dialysis by Mr. Graham are given in Prof. Redwood's lecture, viz:

Dialysis. Twenty-four hours at 54° F. Two per cent. Solutions.	Relative Diffusate.	*Dialysis.* Twenty-four hours at 50° to 60° F. Ten per cent. Solutions.	Relative Diffusate.
Chloride of Sodium,	1·000	Gum Arabic,	·004
Picric Acid,	1·020	Starch Sugar,	·266
Ammonia,	·847	Cane Sugar,	·214
Thein,	·703	Milk Sugar,	·185
Salicin,	·503	Mannite,	·349
Cane Sugar,	·472	Glycerin,	·460
Amygdalin,	·311	Alcohol,	·676
Extract of Quercitron,	.184	Chloride of Sodium,	1·010
Extract of Logwood,	·168		
Catechu,	·159		
Extract of Cochineal,	·051		
Gallo-Tannic Acid,	·130		
Extract of Litmus,	·019		
Purified Caromel,	·005		

Prof. Redwood recommends a large-sized bladder glass, as

used in air pump experiments, in lieu of the gutta percha cylinder, attaching the parchment paper to the larger end. This he supports on a large-sized beaker glass, into which it enters just sufficiently to be half immersed in the water it contains. The liquid to be diffused is then poured in the small upper end, which may then be covered with a glass plate to keep out dust and prevent evaporation.

When the object is to get the diffusate as concentrated as possible, it is necessary to use a shallow vessel, as in the figure, and renew the water when the process is checked; but when the object is rather to exhaust the liquid above the septum of its diffusible matter without reference to the state of dilution of the diffusate, then a deep vessel is best. Prof. Redwood has invented a grooved plate by which a thin stream of water is made to take a spiral course around the outer surface of the parchment paper, from the circumference to the centre, so as to constantly renew the liquid in contact with the septum. There may be an advantage in certain cases arising out of this arrangement, yet the process of dialysis is necessarily so gradual that the simple arrangement of the figure will probably succeed in most instances.

It now remains to remark on the practical applications and uses of dialysis, as they have been thus far developed.

1st. As an agency in proximate analysis; affording a means of separating crystallizable and well defined bodies from amorphous matters, like extractive, gums, mucilages, the pectin-like substances, the tannins, oils, etc. For instance, if a vegetable extract containing an alkaloid or crystalline neutral bitter principle, be rubbed down with water to a uniform mixture and thrown on the dialyser, this active principle, together with all the soluble earthy matter will be found in the diffusate, whilst the inert ingredients will be retained. Mr. John Attfield (Pharm. Jour. March, 1862, p. 417) has applied this apparatus in an investigation of the mineral constituents of plants, especially as exhibited in the saline efflorescences on the vegetable extracts, so familiar to all apothecaries. Mr. Attfield also suggests its use for purifying crude lemon juice.

Mr. Graham has separated the crystallized ingredients of urine. Baron Liebig has isolated creatin from extract of meat;

and more recently he has demonstrated by its means the presence of *alloxan* in an animal secretion. (Pharm. Jour. 528, April, 1862.)

Mr. Büchner has shown (ibid, 572) that when a thick viscous mucilage of marshmallow root is put into the dialyser, over distilled water, after two days the whole of the asparagin of the root is in the first diffusate, and may be obtained in fine crystals by simple evaporation.

2d. Mr. Redwood suggests that dialysis offers the means of producing a new class of medicines, containing the active principle of plants, partially purified, and in the state of combination in which they exist in nature, and he is now engaged in applying the principle to opium and aloes in this view. The field opening in this direction is probably rich in future discovery, and merits the attention of investigators. The main difficulty is the very dilute condition of the solution and the slowness of the operation, and consequent tendency to spoil or ferment; but it may prove, owing to ferments being colloidal matter, that the diffusates may not be liable to change to a degree that will embarrass the operation.

3d. It affords an elegant means of separating crystalline poisons, like arsenious acid, tartar emetic, strychnia, morphia, etc., from the crude colloidal contents of the stomach and intestines, so that they may be at once detected unclogged by inert matter, and Mr. Redwood has "already obtained these substances by dialysis from the stomach, the flesh and the blood of animals that have been poisoned, distilled water alone being used for their extraction." The perfect simplicity of this method, uncomplicated by chemical agents liable to contain these poisons, will add greatly to the force of medico-legal testimony in future prosecutions.

4th. Dialysis, also, says Mr. Redwood, will enable us to explain satisfactorily many physiological and geological phenomena which have hitherto been involved in much obscurity. The stomach of an animal is a dialysing apparatus; in which the soluble food is dialysed, and the insoluble food digested under the influence of crystalloids supplied through the coats of the stomach by diffusion, an action closely resembling that which occurs when hydrated basic chlorides of colloidal oxides, like per-

oxide of iron and alumina, are placed on the dialyser, when free hydrochloric acid is diffused through the septum, while the hydrated oxide remains on the dialyser. It is also probable that the action of medicines when taken into the stomach is influenced by their relations as colloids or crystalloids, some being transfused through the coats of that organ, whilst others exert their influence along the whole alimentary canal.

5th. Lastly, it is believed that the study of the phenomena connected with the diffusion of liquids, will have an important bearing on our knowledge of the real condition of matter, and perhaps throw some light on molecular motion as a source of electricity, heat, and other imponderable influences, thus rendering its investigation worthy alike of the philosopher and the chemist.

PHARMACEUTICAL GLEANINGS AND NOTICES.

By the Editor.

On Coating Pills.—Mr. Barnard S. Proctor, of New Castle on Tyne, England, has published a long list of experiments on the relative merits of processes for coating pills, which have obtained in England, some of which appear to be highly objectionable. In the anxiety to render pills tasteless, it is but too apparent that pharmaceutists are tempted to overlook the effect of the coating to retard their action as medicines. The author gives forty-five distinct modifications of the process, among which the following liquids are employed to moisten the pills, and the following powders to roll them in afterwards:

Albumen, or white of eggs; water; simple syrup; mucilage of gum arabic; Canada balsam, diluted with two parts of alcohol; melted white wax; tincture of shellac; collodion; solution of gelatin; alcohol and syrup, equal parts; tincture of tolu; tincture of sandarach, and tincture of resin.

The powders employed are tragacanth; tragacanth and sugar, equal parts; powdered French chalk; lycopodium; powdered sugar; magnesia; silver leaf; resin and French chalk, equal parts, and shellac and pumice stone powder, made by rubbing shellac and pumice with water to a creamy consistence, and drying the powder. These materials were employed in

various ways to coat pills in the forty-five experiments, and a record retained of their condition after two months keeping in a dry place, and then of the effect produced by transfer to a damp cellar, by dipping in cold water, and of the length of time warm water at 90° required to soften and dissolve the core. The last form of trial was with but a limited number.

The author in summing up his conclusions says: "These experiments show that the oft-repeated story about silvered pills being difficult of solution, must be looked upon as a popular error. The reason why pills occasionally pass through the stomach undigested, must be sought for either in the state of the patient, or the composition of the pill, rather than to the nature of its coating; for even the dipping in lac varnish did not protect the pill for more than an hour, whilst in the stomach heat and moisture are assisted by chemical and mechanical means." "Most of the formulæ yield coatings which are effectual in covering the taste of the pills for a sufficient time. As far as my experiments have gone, none of the coatings cover the odor of pills of assafœtida, camphor, &c."

Of the various processes, the easiest are those in which the pills are first rolled in water or varnish, and then in a powder; viscid fluids like albumen and mucilage are more troublesome. The author prefers a mixture of spirit and water for aqueous, and lac varnish for resinous liquids. Of the powders, magnesia, lycopodium and sugar are apt to become clotty; sugar gives a granular, rasp-like surface; French chalk readily produces a smooth uniform coat with many of the fluids, but is improved by the addition of resin when the liquid used is alcoholic; tragacanth is apt to produce a rough granular coating. The author, who esteems the power of resisting moisture a very important condition of success, says the disadvantage of using coatings soluble in water will be seen by the readiness with which many of the pills become adhesive when exposed in a damp situation. The addition of sugar to tragacanth increases its tendency to soften. He also finds Mr. Furley's coating (albumen with tragacanth and sugar) to become speedily clammy in certain cases, as where pills contain muriate of ammonia or glycerin. The author concludes with the following paragraph: Probably the

choice of a process will depend, in some measure, upon the composition of the pills, and other circumstances which it is difficult to foresee. The processes, No. 29 (rolling in tincture of lac, and in equal parts of resin and French chalk powders,) and No. 45, (rolling in a mixed tincture of ʒss. of lac and ℥i. of resin in fʒiiiss. of spirit, and then in a mixture of three parts French chalk and one part resin,) are those which appear to promise the most general utility. The proportion between the quantity of the tincture and the number of the pills considerably influences the quality of the coat. For dispensing purposes it is convenient to use a two or three ounce pomatum pot, into which the tincture is dropped in about the proportions of four or five minims to a dozen pills, diminishing the quantity for large numbers, then putting in the pills, and shaking them till uniformly covered, after which they may be immediately thrown into a tray sufficiently large to allow of their rolling freely; when covered with the powder, they may be at once transferred to the box, but when occasion permits, it is advantageous that a few minutes be allowed for the hardening of the varnish.

Vesicating Collodion.—Mr. Charles R. C. Tichborne, in the London Pharmaceutical Journal for April, 1862, discusses the subject of vesicating collodion, and offers a formula which he considers effective and worthy of adoption, as uniform and reliable in its action. The author remarks on the variable character of vesicating collodion as dispensed in London, owing to the fact that pharmaceutists have private formulæ differing from each other. Mr. T. thinks, in this preparation, the collodion should be associated with some substance like acetic acid, that will render it permeable by the active principle, which he esteems is not the case with collodion, basing his arguments on the conditions presented by a film of simple collodion on glass, which he examines. Now it is probable that vesicating collodion has been more used in the United States than elsewhere, mainly owing to the lower price of the vehicle; and the experience of American Pharmaceutists shows, that, if well made, the quantity of fixed oil which is withdrawn from the

cantharides is sufficient not only to prevent, in great measure, the contractile force of the film, but to so alter its consistence as to meet the conditions required by Mr. Tichborne. We will first give his remarks and formula, and then state in outline that adopted in the forthcoming United States Pharmacopœia. "First, then, let us examine the texture of a collodion film, to mark its applicability in the present case. If we pour upon a glass slide some recently prepared collodion, and then examine it by the microscope, it will present the following appearance:—a pretty homogeneous and smooth ground, but running through which are slight ridges, which produce large honeycomb markings. These ridges are caused by the quick evaporation of the ether; the whole is interspersed with filaments of partially disorganized cotton in a semi-gelatinous state. However carefully the cotton is prepared, it is next to impossible to get rid of these fibres, some portion always escaping the perfect action of the acids. If we can add a small quantity of glacial acetic acid to the collodion, we shall find the character of the film greatly changed. From the slower evaporation, the honeycomb ridges are no longer palpable, whilst the solubility is so much increased that the filaments are found to have disappeared. This film is perfectly uniform, but it presents this peculiarity, that it gradually dries into a mass of jelly-like globules, which, however, possess but little cohesion; when dry, it is very short, for if the finger be run up the glass, instead of leaving it as a tough skin, it collects as a moist crumbled mass. Having so far seen that the glacial acid, besides destroying the contractility, gives it the properties of porosity and slowness in drying, it follows that such a collodion is particularly suited for the application of any vesicant which we may intend to apply, instead of being a varnish which hermetically seals up the active matters. Glacial acetic acid is one of the best direct solvents of cantharidin with which we are acquainted. Pure cantharidin was found to be very soluble in that acid, a saturated solution depositing it unchanged on evaporation in hard mica-like crystals. The principle, then, we propose is, to exhaust cantharides by a mixture of ether and acetic acid, and to convert these into collodion by the addition of gun cotton.

Take of Cantharides six ounces.

Ether from methylated spirits, 13 fluidounces, or q. s.

Glacial acetic acid, two fluidounces.

Gun cotton, half an ounce.

*Methylated spirit of wine, seven fluidounces, or q. s.

The cantharides, coarsely powdered, are placed loosely in a displacement apparatus, the flow of which can be regulated by a tap; upon this is poured the ether and acetic acid previously mixed together; after the whole has passed through, it will be found that the *debris* has retained by absorption seven fluidounces, which must be displaced by the gradual addition of an equal bulk of methylated spirits. If properly done there is not the least danger of the admixture of the spirits with the percolated menstruum, as the animal substance of the flies swells considerably under the prolonged influence of the spirits, so that the same bulk will be insufficient to quite displace the ether. The ethereal solution should then be made to measure exactly 15 fluidounces by the addition of a little spirit, and may then be converted into collodion by the addition of the gun cotton."

Mr. Tichborne, after asserting that the Mylabris cichorii may be substituted for the cantharides, (a fact well known to us here,) gives the following method of applying his collodion:

"The part upon which the vesicle is to be raised should be painted with the vesicant to the desired extent, bearing in mind that the blister produced always extends to about one-tenth of an inch beyond the margin of the space covered by the collodion. Care should also be taken that there is a considerable thickness of collodion upon the surface. To ensure this, the brush should be passed over and over again until about half a drachm has been used to the square inch, or less when operating on a tender epidermis. It is desirable to cover the surface with a piece of oiled silk or sheet gutta percha, as it hastens the action of the collodion.

In ten minutes, or a quarter of an hour if the cuticle is hard,

* Methylated spirits is common alcohol mixed with a certain portion of wood spirit or methylic alcohol to prevent its internal use, and in which condition the excise duty is greatly reduced with a view to its use in manufacturing.

the collodion should be wiped off with a little cotton wool moistened with ether, when the blister will almost instantly rise."

In comparing the collodion of Mr. Tichborne with that in common use in the United States, almost the only difference is in the presence of acetic acid. Now, there can be but little doubt that the acetic acid in this preparation has a caustic action of its own, independent of the cantharidin, and it may facilitate the action of the cantharides; yet as to the necessity of this aid, or of that other influence it exerts on the consistence of the collodion, there is abundant reason to doubt, unless it be required to effect the vesicoation in the shortest possible time. From Mr. T.'s statement of the time required, we believe his vesicant is quicker in its action than that in use here, but in no other respect does it appear to us improved, whilst the cost is increased. We would also suggest that it is a mistake to use the cantharides in *coarse* powder, and that the quantity of menstruum used by Mr. T. is insufficient to thoroughly exhaust the flies. With these remarks we will offer the recipe which was provisionally adopted by the revising Committee of the U. S. Pharmacopœia.

Take of Cantharides, in fine powder, eight ounces.
Cotton, prepared as for collodion, [gun cotton] 100 grs.
Ether, a sufficient quantity.

Pack the cantharides firmly in a percolator, cover it with muslin and pour on ether until fourteen fluid ounces have slowly passed. Dissolve the gun cotton in this liquid, set it aside, and continue the percolation until eight fluidounces more of the ethereal liquid is displaced, which is to be evaporated till it measures two fluidounces. Lastly, add this to the first liquid and mix thoroughly. If after standing 24 hours a sediment should be observed, decant the clear collodion, which should possess a decided green color, and preserve it in a close bottle.

Sinapic Collodion.—Mr. Tichborne also suggests the following recipe for applying oil of Black Mustard as a rubefacient:

Take of Volatile Oil of Black Mustard a fluidrachm.
Collodion, six fluidrachms.
Acetic acid (glacial) gtt. xx.

The acid is introduced to modify the consistence of the collodion. This preparation occasions more pain than that with

cantharides, and is less active as a vesicant. Mr. T. suggests that both this and the cantharidal vesicant may be diluted with common collodion, so as to become merely rubefacients.

The Granulation of Medicines.—Dr. Thomas Skinner, of Liverpool, has called attention to this subject in a detailed article, at page 573 of the Pharmaceutical Journal. After referring to a paper by Dr. Henry Kennedy, of Dublin, in the *Dublin Medical Press*, who lays it down as an axiom in therapeutics, that the form of powder "is the most efficacious in which a medicinal substance can be administered," he expresses himself of the same opinion, and says he has frequently sought a method of rendering powders more easy of deglutition, and less offensive to the nose and palate, and concluded that the form of *granules* would meet the difficulty. On consulting with Mr. Samuel Banner, Pharmaceutist, of Liverpool, and calling his attention to the "Poudres Granulées" of the French, the process of preparing which with syrup and heat is a part of the confectioner's art, that gentleman at once suggested a very simple plan, by means of which pulverulent medicines may be granulated to a firm consistence, with the aid of but little heat and moisture, with the production of a granular powder that may be swallowed with water without leaving a trace of the medicinal substance, or the slightest sensation to indicate its recent presence near the nerves of taste and smell. The process is analogous to that for granulating gunpowder.

Method of preparing the granules.—The first step is to procure the material of good quality. The powders need not be *very* fine in order to form granules, hence sifted ground powders may be used.

1. *Making the Mass.*—The powder, however obtained, is put into a wedgewood mortar, and sufficient mucilage of gum arabic (U. S. P. or Lond. Ph. strength) is added to make a mass of so dry a consistence that it will readily crumble, and not be adhesive when rubbed against a coarse sieve, a condition soon learned by practice. The powder may also be made into a stiff paste rolled into flat thin cakes, dried at a low temperature, and coarsely powdered or bruised in a mortar.

2. *Granulating and sifting.*—The process requires three

sieves of the sizes of 12, 15, and 20 meshes to the linear inch, and these are to be fitted together like a drum sieve, the coarsest being at the top, the finest at the bottom. The mass is now rubbed through the top sieve with the open hand, the sieves are then shaken as in ordinary sifting. The second sieve will retain the larger granules, the lower sieve the finer, whilst the pulverulent particles pass through below, and may again be treated after being damped in the manner as before. When the mass is formed into cakes and bruised, it is sifted in the same way, the finest particles being worked over again.

3. *Drying, Coating, and Water Proofing the Granules.*—The granules by the first process are spread on paper and occasionally stirred till dry, or if the process is not injurious to some ingredient they may be dried in a metallic pan subjected to a moderate heat, with constant stirring, or more speedily in a current of dry hot air with occasional stirring. When perfectly dry they are placed in a mortar, or capsule of convenient size and a sufficient quantity of strong tincture of tolu (℥iij. to f.℥j.) in which any flavor desired has been dissolved and stirred until the entire mass of granules appear to be equally coated and glossy, when they are again subjected to the drying process with constant stirring.

Granules well prepared in this manner are compact, and to some extent insoluble in cold water; a desideratum, as they may be conveniently administered in that vehicle, without imparting to the water the slightest taste, smell, or color. The proportion of gum in these granules on an average is one-sixteenth, and that of the tolu too small to estimate, so that in calculating doses, but little abatement need be made for these excipients.

Advantages of Granulation.—This form tends to preserve medicines containing volatile active principles. With the exception of extracts, granules contain a larger percentage of active matter than most other preparations of drugs, and for this reason many saline and caustic irritant remedies should not be exhibited in this form, that of solution being more appropriate.

Again, as all the officinal pill masses are capable of being as easily granulated as powders, it is not improbable that pills may be to some extent superseded by granules. The granulation

of pill masses would render them more certain and rapid in their action, more easily administered to children and many adults, and the doses easily proportioned; if once introduced into use, they would become an imperative necessity, owing to popular favor.

Doses and mode of administering granules.—As the quantity of excipient is only a sixteenth, the doses of the officinal powders may be considered appropriate for granules. They may be dispensed in separate dose packages or in bulk. The denser condition of these granules occasion them to occupy less space than the simple powders. A teaspoonful (unheaped) of charcoal granules equals 50 grains; of compound powder of rhubarb, 70 grs. Mr. Banner's method will not answer for extemporaneous prescriptions, involving too much time.

Granules are administered—1st, by placing the dose on the tongue, and then swallowing them with a mouthful of water; or 2d, by stirring up the dose in a wine-glassful or part full of water, and swallowing the whole. The latter is the more approved method.

Dr. Skinner concludes his paper with a special recommendation of this form for the powders of charcoal and ergot. Of the former he says, the disgust occasioned by the color and behaviour of charcoal powder is entirely avoided in granules, a teaspoonful of which may be taken thrice daily without annoyance.

Granules of ergot should be of the smaller size, as more soluble, and when made from fresh active powder, retain their power much better than the powder; and he has found them more certain and reliable than any fluid preparation that he has tried.

Ratio of value between Imperial and Wine measure.—The following fact has been brought to our notice by Mr. Alfred B. Taylor, of Philadelphia. It may prove useful in practice in aiding calculations:

A curious relation exists between the pint apothecaries' or wine measure, and the pint Imperial measure: the Imperial pint being almost exactly one-fifth larger than the wine pint.

A wine pint = 28·875 cubic inches, or 7291·11 grs.
Add one fifth = 5·775 " " " 1458·22 "

34·650 " " " 8749 33 "

An imperial pint = 34·659 cubic inches, or 8750 grs.

GLEANINGS FROM GERMAN JOURNALS.

By J. M. Maisch.

Preparation of Iodine.—Dr. Luchs publishes in Wittst. V. Schrift x. 536—539, a new method for preparing iodine, which was employed by him in 1857, and which he thinks will be found advantageous on a large scale. The saline residue for the preparation of iodide of potassium was dissolved in water, and treated with sulphuric acid and powdered bichromate of potassa; after continued stirring, the iodine crystallizes out, and but little remains in the mother liquor which may be gained by distillation. The iodine is strained off, washed with little water, and sublimed in a retort from a steambath. The reaction is as follows: $3KI+KO,\ 2Cr\ O_3+8HO,\ SO_3=4(KO,\ SO_2,+HO,\ SO_3)+3I+Cr_2\ O_3+4HO$. From the dark green liquid, sulphate of potassa and oxide of chromium may be obtained, which will cover a portion of the costs.

Analysis of Anacahuite Wood.—Dr. L. Müller analyzed the bark and wood separately. He obtained much oxalate of lime, sugar, starch, tannin, producing a green black precipitate with ferric salts, citric and humic acids, resin, wax, and a little bitter extractive. The tannate of lead has the composition $3PbO,\ C_{16}\ H_{12}\ O_{10}$, and appears to be allied in composition to catechu-tannin. The humic compound is composed of $C_{16}\ H_{10}\ O_{14}$, the resin of $C_{48}\ H_{34}\ O_{20}$. Kinic acid was not present. The bark dried at 100° C. yielded 17.673 per ct., and the wood 3.776 per ct. ashes, or the wood together with the bark 7.25 per ct.; medicinally the large proportion of oxalate of lime, also of tannin, requires some attention.—(Wittstein's V. Schr. x. 519—536.)

Color of Wafers.—Professor Wittstein found in red wafers 42 and 25.59 per ct. red lead; in yellow wafers, 14.03 chromate of lead, and 18.78 sulphate of baryta; in green wafers 38.43 ashes, of which 13.50 was chromate of lead; the Prussian blue was not estimated. Of four kinds of blue wafers, three were colored with ultramarine, and one with Prussian blue; one of the former contained traces, another 7.37 per ct. PbO in the form of carbonate of lead. White wafers and the following four kinds contained only traces of lead; violet, rose and flesh-colored

wafers were colored by lakes; brown wafers by ochre.—(Wittst. V. Schr. x. 557—559).

Pilules contre la goutte et les Rheumatisms de Laytigue, which are sold in boxes containing twenty-four pills, for ten francs, are composed, according to Professor Wittstein, of 2 grains powdered colchicum seed and ½ gr. sugar and mucilage, each pill weighing about 2½ gr.; they are rolled in lycopodium.—(Wittst. V. Schr. x. 598—600).

Purification of Fusel Oil.—B. Hirsch rejects the fractional distillation of crude fusel oil, either with or without previous washing with water. He removes most of the alcohol by agitating the crude liquid with a concentrated solution of table salt, repeating the operation three or four times, until the volume ceases to be diminished. The fusel oil, still containing traces of alcohol, is distilled with three or four times its quantity of water, like the essential oils. The aqueous portion of the distillate contains all the alcohol, and the fusel oil is obtained colorless and pure, without imparting much of its disagreeable odor to the atmosphere. It is remarkable that, from beginning to end, the oil distills in relatively the same quantity, so that it suddenly ceases to appear in the distilling vapors, which now contain only pure water. It is from this behaviour that the apparatus afterwards have scarcely an odor of fusel oil, and are easily cleansed. Thus the whole of the fusel oil is obtained, except the minute portion dissolved by the wash waters.—(Buchner's N. Repert. x. 294—297.)

On Chelidoninic Acid.—Professor G. F. Walz has prepared this acid according to Zwenger's directions (see Am. Journ. Ph. xxxiii. 10.) from 200 lb. Chelidonium majus, and obtained by ether, a small quantity of an acid, which from its baryta salt and from its solubility in ether, (1000 parts dissolved ·016 to ·017), turns out to be succinic acid. This acid had been found in celandine by Reinsch (Jahrb. d. Ph. xiv. 34.) W. Engelhardt (Zeitsch. f. Chem. and Pharm. iii. No. 20) obtained by ether a solution of malic acid, which, after neutralization with lime, was decomposed into succinic acid. Walz supposes that the succinic acid $C_8 H_6 O_8$ originates from the malic acid $C_8 H_6 O_{10}$ through the

deoxidizing influence of sulphuretted hydrogen, and he has succeeded in obtaining it from malic and from tartaric acid $C_8H_6O_{12}$ by heating a saturated solution of either of these acids in hydriodic acid, enclosed in a sealed tube, to 120 or 130° C. for six to eight hours. Escholtzia Californica, Papaver somniferum and Teucrium scorodonia, treated by Zwenger's process, yielded likewise succinic acid.—(N. Jahrb. d. Ph. xv. 22—28.)

Pate Iodifère, a French nostrum, sold for killing the nerves of decayed teeth, at 5·50 francs per flask, was found by Leimbach, of Karlsruhe, to consist only of arsenious acid and hydrochlorate of morphia, colored by a little Prussian blue. The proportions are one part arsenious acid and three parts of the morphia salt, rendered pasty apparently by glycerin.—(N. Jahrb. d. Ph. xv. 272.)

Oil of Valerian.—Mayer of Heilbronn has made some experiments with dry valerian root. He found the root collected in spring to yield more acid and less oil than the fall root; calculated for 10 lbs. of the root he obtained in 1858, 4·3 drachms valerianic acid and eight dr. oil; in 1859, 6 dr. acid and 5¼ dr. oil. The oil cost him per oz. $1.25 and $1.60 respectively. Even if the acid was assumed at the same price as the oil, the ounce was respectively $0.96 and $1.07, while the oil is quoted by the best druggists at 60 cents per oz. He intimates that oleum templinum and ol. terebinthinæ are much cheaper than ol. valerianæ.—(N. Jahrb. d. Ph. xvi. 21—22.)

Glycerin.—Mayer found in commercial glycerin of spec. grav. 1·21 chloride of calcium, which he removed by digesting with oxide of silver, precipitating the dissolved silver by sulphuretted hydrogen, and the lime by oxalic acid. A volatile acid was expelled, for the greater part, by heating to between 257 and 279° F. for several hours; its spec. grav. was then 1·27, and the yields from 6¼ lbs. after filtering through charcoal, amounted to 5 lbs.—(N. Jahrb. d. Ph. xvi. 23.)

Extractum Belladonnæ.—Mayer prepared extracts from two lots of well-dried belladonna root by exhausting with a mixture of 3 p. alcohol and 2 p. water; he obtained 27 and 26·28 pret.

respectively. The atropia was separated in two different ways: 1, by dissolving 5 grms. of the extract in alcohol, precipitating with subacetate of lead, treating the filtrate with sulphuretted hydrogen, evaporating to 1 grm., adding ammonia, agitating repeatedly, with pure ether and evaporating the ether spontaneously. Yield ·040 grm.=·8 per ct.; 2·10 grm. were triturated with a little water and ammonia, agitated with ether, the ether evaporated, the residue dissolved in acetic acid, decolorised by animal charcoal, evaporated and treated with ammonia and ether. Yield ·125 grm.=1·25 per ct. averaging 1·02 per ct. for the extract, or ·26 to ·27 per ct. for the dry root. The author was unable to separate atropia by the same process from belladonna extract, prepared from the fresh herb by the process of the Württemberg Pharmacopœia.—(N. Jahrb. d. Ph. xvi. 24.)

Stearoptens.—J. Wandsleben analyzed crystals deposited from aqua petroselini; composition C_{20} H_{14} O_8; also octohedrons from spiritus juniperi; composition C_{12} H_{14} O_{12}.—(N. Jahrb. d. Ph. xvi. 82.)

Sophistications.—J. Franck obtained a commercial jalap, which was mixed with tubers deprived of the resin. The tubercles of the true tuber had disappeared, the nearly parallel wrinkles formed in irregular shapes, enclosing deeper plains; their odor reminded of aqueous extract of jalap, and the section was of a dirty white color, without darker lines. Cold water assumed a dark brown color, while it is scarcely colored by good jalap.*

The author met with a lycopodium of a fine granular appearance, in which he detected the pollen of several coniferæ, to the amount of about 50 per ct.

Under the name of scammony at $8.00 per lb. he obtained from different drug houses an artificial product, consisting of

* The same adulteration has been practised with some jalap of our commerce, and the exhausted tubers correspond in appearance with the description given above. I have seen several samples with longitudinal incisions, made apparently with a sharp knife, which facilitates the extraction. But was this done by unscrupulous druggists here, or was the article imported in this state? J. M. M.

the smallest portion of resin, but mostly of the meal of leguminous seeds; once also mixed with crushed peas.—(N. Jahrb. d. Ph. xvi. 83, 84.)

A new Volatile Acid in Hops has been discovered by Dr. F. L. Winkler. Lupulin is distilled with water acidulated with sulphuric acid; the distillate is moderately heated with pure carbonate of lime, and the filtrate evaporated. The lime salt is of a gummy appearance, and possesses the strong odor of hops, like the other salts of the same acid, which resembles valerianic acid. The author is now investigating it.—(N. Jahrb. d. Ph. xvi. 134.)

The quantity of Iodine in Cod Liver Oil was estimated by S. Neininger, by saponifying the oil with caustic soda, incinerating the soap,* exhausting the ashes with alcohol, distilling and precipitating with nitrate of palladium. 500 grm. oil yielded ·396 Pd. I=·278 I=·0556 per ct.—(N. Jahrb. d. Ph. xvi. 134.)

Hemine.—E. Scriba, who experimented with Professor Dr. Simon in preparing hemine crystals from recent and forty years' old blood spots, recommends novices to experiment first with recent blood spots before undertaking a forensic detection of blood. The preparation treated wrong will never yield crystals. He observes:

1. Very old blood spots will yield hemine crystals as long as any coloring matter of blood remains.

2. Spots which do not yield their coloring matter to water, are best dissolved by boiling with glacial acetic acid; cold maceration of the dried blood may be even sufficient and preferable in such cases where other substances may be dissolved by boiling acetic acid.

3. The cold aqueous maceration must not be omitted where acetic acid might dissolve other coloring matters or compounds; if possible, both solutions ought to be made and examined, as one may corroborate or complete the other.

4. The extract with acetic acid ought to be made at once, as

* It is to be presumed that the soap, together with the mother liquor, was incinerated, as the latter would contain much of the iodine.

concentrated as possible, and evaporated at a very gentle heat; a few drops of a concentrated solution yields a better result than a large quantity of a diluted one.—(N. Jahrb. f. Ph. xiv. 129—134.)

Ammonium-Iron.—The galvanoplastic deposit from protosalts of iron in presence of an ammonia salt, resembles polished steel, and adheres well when in very thin layers, but peels off in scales when thicker. After washing with water, the precipitate loses ammonia over caustic potassa, and when ignited, and in boiling water, an evolution of hydrogen is observed. Dr. Meidinger views this as a compound of iron, with the hypothetic metal ammonium. The quantity of combined ammonium is very small; in one sample he proved not over 1¼ per ct.—(N. Jahrb. f. Ph. xvi. 295. 296.)

Estimation of Chlorine in organic compounds.—Dr. Carius has modified his method of estimating the inorganic elements in organic compounds (heating in a sealed glass-tube with nitric acid and estimating the products of oxidation) for chlorine, bromine and iodine, by adding a small excess of nitrate of silver. The decomposition is, with the exception of the aromatic series, readily effected, frequently at ordinary temperature; the bodies just mentioned are best decomposed in presence of bichromate of potassa, when the resulting chromate of silver is removed by diluting the acid liquor and boiling. Excess of silver salt has no effect on the accuracy of the analysis; but a large amount of even dilute nitric acid dissolves chloride of silver, and renders the neutralization with carbonate of soda requisite.—(N. Jahrb. f. Ph. xvi. 283, 284.)

Reaction of Hydriodic Acid with Glycerin.—Dr. Erlenmeyer states that the distillate obtained from glycerin, with little hydriodic acid, contains much iodide of allyle; on increasing the acid, the allyle iodide diminishes, and in its place iodide of propyle appears in the distillate, which boils between 85 and 90° C., is very refractive, and resembles in odor iodide of ethyle. The supernatant liquid of the crude distillate yields sometimes iodoform on neutralizing with potassa. The residue in the retort is black resinous, and yields, when distilled with

water, white insoluble crystals; treated with alcohol, the alcohol evaporated and the residuary liquor mixed with solution of potassa, a brown solution is obtained, and white crystals containing iodine and possessing a peculiar aromatic odor. The crystals have not been examined yet.—(N. Jahrb. f. Ph. xvi. 290.)

Odontine, Toothpaste.—96 parts prepared oyster-shells, 4 p. pumice stone, 12 p. orris root, 20 p. Castile soap, 16 p. syrup, 1 p. oil of peppermint, 1·12 p. oil of cloves, 10 p. water, 10 p. alcohol; the whole to be well mixed and dried.—(Winkler, N. Jahrb. d. Ph. xiv. 309.)

Bryonitin, (see A. J. Ph. vol. xxxi. 249.)—Prof. Walz reports investigations of Mr. Cucuel, which disprove the existence of bryonitin; this supposed compound proves to be a crystalline fatty acid and saponifiable fat of a bitter taste, caused by a little adhering bryonin, the latter rendering it soluble in boiling water.—(N. Jahrb. d. Ph. xvi. 8–10.)

On Colocynth.—Prof. Walz recommends the process of Hübschmann for preparing colocynthin sufficiently pure for medical use. The process consists in precipitating a concentrated aqueous infusion with carbonate of potassa, and purifying the precipitate by dissolving it in ether. The colocynthitin (see A. J. P. xxxi. 331) proves to be a white crystallizable resin destitute of taste, of the composition of C_{40} H_{32} O_9.—(N. Jahrb. d. Ph. xvi. 10, 11.)

Oleum and Aqua Amygdalæ Amaræ.—Michael Pettenkofer concludes from a series of interesting experiments, that the strongest bitter almond water is obtained as follows: press the bitter almonds well, and add 11-12ths of the residue gradually to boiling water, and allow to cool; add the cold prepared emulsion of the remainder; macerate for six or twelve hours, then distil slowly. The boiling water coagulates the emulsin and albumen, but dissolves the amygdalin, which is readily decomposed by the emulsin of the emulsion subsequently added.

The almonds may be expressed between 40 and 50° R. (122 and 144° F.) without injury to the oil, the amygdalin, or emulsin. The press cakes preserve their virtues for a long

time, provided they are kept dry. The simplest and most reliable method of estimating the hydrocyanic acid of bitter almond water, is that proposed by Liebig. To 500 grs. of the water add a little caustic potassa, and 1 or 2 grs. chloride of sodium; now add, drop by drop, a solution of 63 grs. pure nitrate of silver in sufficient water to weigh 12½ ounces, until a permanent turbidity of chloride of silver takes place; 300 grs. of the silver solution indicate 1 gr. anhydrous hydrocyanic acid.

To obtain a clear bitter almond water, add 6 drops dilute sulphuric acid to 12 oz. of the freshly distilled water.—(N. Rep. der Ph. x. 338—359.)

Rish-e-Taft, Taftroot.—Prof. Dr. C. Schroff received from Dr. Polak, physician to the Shah of Persia, this root, which is used in various nervous diseases. From his experiments on rabbits, the author concludes, that the root belongs to his 3d order of the narcotics, and is allied to Hyoscyamus, Atropa and Datura. On referring to the herbarium of the University of Vienna, the author pronounces it to be the root of Scopolia mutica, Dunal, but regards it as probable that the root of Hyoscyamus bipinnatisectus, Boissier, may likewise be used under the above name. —(Buchner's N. Rep. x. 364—384.)

Croton Erythraema, Martius, yields by incisions a blood-red juice called by the Brazilians Sanque de Drago, which, according to Th. Peckolt, is used as an astringent in chronic diarrhœa, gonorrhœa, fluor albus, hæmorrhages, and as an application to wounds. The astringency appears to be due to ordinary tannin; it further contains gum, pectin, albumen, sugar, resin of an agreeable benzoin odor, gallic acid, erythraemic acid and inorganic salts.—(Archiv. d. Ph. cviii. 142—154.)

DETECTION OF $\frac{1}{100}$ OF A MILLIGRAMME OF QUINIA.

By F. A. Fluckiger.

(Presented to the Annual Meeting of the Apothecary's Society of Geneva.)

In the March number of the "Swiss News," 1861, page 65, I have called attention to the fact that the well-known fluores-

cence of the sulphate of quinia is a finer agent for discovering its presence than all other known reagents for quinia. Induced by the wonderful sensibility of spectral analysis for the discovery of many substances, I sought the limit of fluorescence of a quinine solution, and found, to my astonishment, a most extraordinary intensity. One is able to discover through the reaction of ammonia and prussiate of potash 1-8000th to 1-10,000th of quinia. When sulphuric acid is in excess, the fluorescence is observable if there be but 1-100,000th of quinia present, when you fill a common test tube with the solution, expose it to the sunlight, and hold a piece of black paper against it. At a higher dilution the fluorescence disappears to the eye altogether, but it becomes visible at once, if a pencil of rays is made to fall vertically, or even obliquely through the tube when the outline of the converging rays is clearly observable, when the solution of sulphate of quinia contains only 1-200,000th of alkaloid. Yet this reaction is so extremely acute, that by very favorable light and a careful manner of proceeding, (strong magnifying tube of the utmost possible focal distance, pure white glass, and dark background,) the 1-400,000th to the 1-500,000th becomes visible. In this way one can absolutely discover 1-2000th to 1-4000th part of a milligramme of quinine. This extraordinary sensibility exceeds anything that the analysis of the alkaloids has furnished to this time, the reactions of strychnia only showing a close approach to such great acuteness. The simplicity and certainty of this test compares favorably with the spectral analysis, which shows only a much greater sensibility for sodium, strontium, and calcium; while, for instance, the spectral analytical reaction reaches its limit for copper at 1-275th milligramme, and for potassium and boracic acid at 1-1000th milligramme.

It seems that so sensitive a reaction for quinine is of no practical utility, but this is no reason that it should be overlooked.

In conclusion, I will observe, that æsculin and chlorophylle behaves in the same manner in reference to light.—*Witts. Vierteljahresschrift*, 1862.

P. L. J.

PRESERVATION OF COLD INFUSION OF SENNA BY FILTERED AIR.

According to the observations of Dusch and Schröder, moist organic matter may be not only kept for months but for years, under cold water, if you put them in a matrass and expose them to the heat of a water bath, and close them afterwards with a stopper of cotton. The authors try to explain this wonderful fact by supposing that the cause of the decomposition by putrefaction or fermentation of organic matter depends on the presence in the water of certain extraordinarily minute germs floating in the air. The heat destroys these germs as they exist in the air of the matrass, and the stopper of cotton put on afterwards will allow the air to pass in, but keeps back the germs which are contained in it.

This discovery, so theoretically and practically important, has induced Folberth, an apothecary of Mediasch in Siebenbürgen, to try it for the preservation of medicinal substances which are apt to spoil easily. He first tried compound infusion of senna, by heating a freshly prepared infusion to the boiling point, then closed the matrass with a cotton stopper, and kept it in a room where the temperature was usually 72°. After the lapse of a month he opened the matrass; the infusion was clear, and not to be distinguished by color, smell or taste from one freshly prepared. The small sediment at the bottom of the vessel was the result of the clarification of the fluid by deposition. The cotton stopper being replaced by a cork, mouldiness began to show itself the second day.

An infusion prepared at the same time and kept along side of the other, but closed with a cork, exhaled a spoiled smell on the third day, and mouldiness on the fourth appeared.

To avoid the necessity of boiling and restopping with cotton, after each use of the infusion, the author recommends the use of a syphon arranged at the beginning by passing it through a cork, loosely closing the entrance and passing through the cotton stopper, the long end of the syphon being furnished with a gum-elastic tube and pressing spiggot, or cut-off, of wire. The tube is to be filled at first. As the infusion is drawn off, the air enters through the cotton, and is deprived of its power of injuring the liquid.—*Wittstein's Vierteljahrsschrift*, 1862.—F. L. J.

ON THE CHEMICAL CONSTITUTION OF THE WAX OF THE MYRICA CERIFERA.

By Gideon E. Moore, B. P.

The fruit of the *Myrica cerifera* yields a wax which for many years has constituted, to a limited extent, an article of commerce in the United States under the names of Myrtle-wax, Candleberry wax and Bay-berry Tallow. It occurs abundantly as a white incrustation on the small globular nuts of the plant. To prepare it in a nearly pure state, the berries are enclosed in bags of coarse cloth and kept immersed in boiling water until the fused wax collects on the surface; it is then poured off into pans in which it solidifies on cooling—in this form and without further preparation it is brought into commerce. It is employed in its pure state as a polish to diminish the fr ction between surfaces of wood moving in mutual contact, and in admixture with other fatty bodies as a substitute for bees-wax in the manufacture of candles. It is also used in polishing furniture and enjoys some popular repute as a remedial agent.

We are indebted for the first published account of this substance to Alexandre,* Surgeon, correspondent of M. de Mairan, who mentions a wax obtained in Louisiana from the fruit of a tree about the size of a cherry tree, and resembling myrtle in appearance, which he states to have been employed by the colonists in the manufacture of candles. Mr. Alexandre likewise states that the water in which the berries have been boiled, when evaporated to the consistence of an extract, is a certain cure for the most violent cases of dysentery.

At a later period accounts of the tree or shrub were given by Marshal, Lepage-Duprat, and by Toscan, Librarian at the Museum of Natural History at Paris. The latter in a memoir in his work entitled *L'Ami de la Nature* gave a circumstantial description of the mode of collecting the wax in early colonial times.†

* Hist. de l' Academie Ann. 1722 and 1725, pp. 11 and 39.

† "Towards the end of autumn when the berries are ripe, a man leaves his house, together with his family, to go to some island or bank near the sea shore where the wax trees grow in abundance. He carries with him vessels to boil the berries, and a hatchet to build a cottage where he may

The traveller, Kalm, speaking of myrtle wax, says, "in the country where it grows, they make excellent soap of it which washes linen perfectly white."

The first attempt to investigate the chemical composition of the substance was made by the Danish chemist, Dr. John, in the early part of the present century. By treating the wax from the *M. cerifera* with boiling alcohol, this observer separated it into two portions. To the soluble portion he gave the name of *cerin* and to the insoluble that of *myricin*, from the specific and generic names of the plant. Subsequently discovering as he supposed two identical substances in bees-wax, he conferred upon them the same names, which are even still in use.

In the year 1802 Mr. C. L. Cadet gave an account of the myrtle berry and the mode of culture, with experiments on the solubility of the wax in various menstrua, and mentioned that it saponified readily with the alkalies.

A few months later, Dr. John Bostock gave an accurate description of the physical properties of the wax, its comportment towards solvents and alkalies, and concluded by stating the

find shelter during his residence in this place, which is usally three or four weeks. While he cuts down trees, his children gather the berries. A very fertile shrub will afford nearly seven pounds. When these are gathered the whole family employ themselves in procuring the wax. They throw a certain quantity of the berries into the kettle, and then pour a sufficient quantity of water on them so as to cover them to the depth of about half a foot. They then boil the whole, stirring the grains about and rubbing them against the sides of the vessel in order that the wax may more easily come off. In a short time it floats on the water like fat, and is collected with a spoon and strained through a coarse cloth to separate it from any impurities which might be mixed with it. When no more wax can be obtained, they take the berries out with a skimmer and put others into the same water, but it must be entirely changed the second or third time, and in the meantime boiling water must be added as it evaporates in order to avoid retarding the operation. When a considerable quantity of wax has been obtained by this means, it is laid on a cloth to drain off the water with which it is still mixed. It is then melted a second time, and it is then formed into masses. Four pounds of berries yield about one of wax; that which is first obtained is generally yellow; but in later boilings it assumes a green color from the pellicle with which the kernel of the berry is covered."—*Translation in Nicholson's Journal*, vol. iv. p. 189.

affinity of myrtle wax to the fixed oils—at the same time giving it as his opinion that the vegetable waxes bear the same relation to the fixed oils of plants that the resins do to the essential oils, i. e., are derived from them by the process of oxydation.

Besides these early imperfect notices of the myrica wax, we have more recently an elementary analysis by Lewy, who found its composition as follows:

Carbon, ...	74·00
Hydrogen, ...	12·00
Oxygen, ...	14·00
	100·00

Chevreul also examined the myrica wax. According to him it is completely saponified by potash-lye, and yields in the operation besides glycerine, stearic, margaric and oleic acids. As will appear in the sequel, this distinguished chemist must have operated on an adulterated specimen.

The wax employed in the following research was the commercial article as found in the drug stores of New Haven, and was collected in the vicinity of this place. To the kindness of Mr. E. W. Blake, Jr., I am indebted for a small specimen prepared by himself from berries gathered in Rhode Island, this enabled me to test the purity of the commercial wax. The latter though procured at different times from several sources, in no case appeared to have been adulterated, as shown by the uniform fusing point of the wax itself, and of the mixed fatty acids resulting from its sponification.

The wax, as existing in commerce, is of various shades of color, from grayish-yellow, nearly destitute of any other tint, to a rich deep green, due to chlorophyll; the odor is balsamic and slightly aromatic, much more powerful, however, in the dark than in the light colored varieties. These differences in appearance and odor are not connected with any material variation in the other physical properties, such as specific gravity and fusion point, which remain nearly constant throughout.

The specific gravity of myrtle wax ranges from 1.004 to 1·006 and the point of fusion from 47° to 49° C. Its hardness and brittleness are much greater than those of beeswax. According to Dr. Bostock one hundred parts by weight of boiling alcohol

dissolve five parts of the wax, four-fifths being deposited on cooling and one-fifth remaining suspended in the fluid, but gradually depositing after a few days, or it may be precipitated at once by the addition of water. Only four-fifths of the wax are dissolved by hot alcohol, the remainder being totally unacted on even by prolonged digestion with fresh quantities of the solvent. Boiling ether, according to the same author, dissolves more than one-quarter of its weight of the wax, of which, the greater part separates on cooling. At a moderate heat it is also taken up by oil of turpentine to the extent of six per cent.

With a solution of caustic potash, myrtle wax saponifies readily, giving a fragrant soap which is freely soluble in water, and which by decomposition with sulphuric acid yields a mixture of fatty acids fusing at 61° C., and readily soluble in hot alcohol. From this solution it may be wholly precipitated by an alcoholic solution of acetate of lead. Upon washing and drying the precipitate, and digesting it for several days at a moderate temperature with twice its bulk of ether, a waxy substance was dissolved which did not blacken by sulphide of ammonium and left no residue upon ignition, thus proving the absence of oleic acid. The portion dissolved by ether consisted of unsaponified wax, which being suspended in the solution of soap in a state of fine division escaped detection, was carried down mechanically in the precipitate produced by acids, thrown down a second time in the precipitate by acetate of lead, and was afterwards dissolved out by the ether.

A portion of the wax was saponified with litharge and the lead soap repeatedly washed with water. Upon evaporation of the washings in vacuo, a viscid fluid was obtained possessing the sweet taste and other characteristic properties of glycerine; the quantity obtained was, however, quite small in proportion to the amount of wax employed.

About two pounds of the wax were then saponified with caustic potash and the soap decomposed by sulphuric acid, the precipitate was fused and agitated repeatedly in contact with renewed portions of distilled water, and finally dried. It possessed a fusing point of 60° C. A portion of this substance was introduced with a considerable quantity of distilled water into a capacious retort and subjected to distillation; after about one-half

of the water in the retort had passed over, the distillate was found to contain a few globules of fused fat floating on its surface; these were collected and their fusing point taken; it was found to be identical with that of the substance previous to distillation, thus proving conclusively the absence of the more volatile fatty acids.

One hundred grammes were taken, and, after solution in alcohol, were subjected to fractional precipitation, the method originally proposed by Heintz being employed under the following modification. The alcoholic solution of the fatty acids was made of such strength that the degree of saturation at which a precipitate separated on cooling to the ordinary temperature of the atmosphere, was almost, but not quite, attained. The solution was measured and one-tenth part was poured into another vessel, this portion was then precipitated as accurately as possible by a saturated alcoholic solution of acetate of lead. The precipitate, together with the fluid in which it was suspended, was now poured back into the remaining portion of the solution, and the whole heated to ebullition, and maintained at that temperature until the precipitated lead salt was redissolved and the fluid was brought to nine-tenths of its original bulk. The whole was then set aside to cool, by which the precipitate was a second time thrown down. This precipitate was collected on a filter and dried, as the *first fraction*. A portion of the filtrate equal to that first taken was now precipitated accurately with acetate of lead, the precipitate with the fluid in which it was suspended was poured back into the rest of the solution, the whole heated and evaporated until brought to eight-tenths of its original bulk, and after cooling, the precipitate collected and dried as the *second fraction*. This operation was repeated until *nine fractions* in all had been obtained, the fluid to be precipitated occupying successively, $\frac{9}{10}$, $\frac{8}{10}$, $\frac{7}{10}$, $\frac{6}{10}$, $\frac{5}{10}$, $\frac{4}{10}$, $\frac{3}{10}$, $\frac{2}{10}$, and $\frac{1}{10}$, of its original bulk. The last portion of fluid containing the *tenth fraction* gave no precipitate with acetate of lead, and upon examination was found to contain the ethylic ethers of the fatty acids with but very little free acids.

Of the fractional precipitates thus obtained, the 1st, 2d, 3d, 7th, and 9th were further examined. They were decomposed

by repeated boiling with moderately dilute hydrochloric acid, and the fatty acids thus separated were thoroughly washed by hot water. The fusing points of these products were as follows, respectively:

1st fraction, 60·5° C.; 2d, 61·°; 3d, 61·°; 7th, 55·°; 9th, 50°. The 10th fraction which gave no precipitate with acetate of lead remained fluid at 20·° C.

The fact that by long boiling the mixed fatty acids with water, a distillate was obtained which had the same fusing point as the original mixture, together with the narrow range of fusing points among the fractions first examined, made it appear unnecessary to study the others.

The products obtained from each of the above mentioned lead precipitates were severally subjected to repeated crystallization from alcohol, until the fusing point of the crystals stood unaltered by further treatment. From each fraction an acid was thus procured which fused at 62° C., and agreed in all respects with *palmitic acid*. The first three fractions consisted almost entirely of this substance, and it was present in considerable quantity even in the ninth fraction.

The filtrates from the crystallization of the 7th and 9th fractions were then mixed and subjected to recrystallization. A crop of crystals thus obtained likewise fused at 62° C. The new filtrates were then mingled and crystallized again with the same results.

The concentrated mother liquors from which nearly all the palmitic acid had thus been separated, were now evaporated nearly to dryness, and the mass saponified to destroy the ethers formed by prolonged contact with alcohol. The soap was decomposed by acids, the precipitate dissolved in alcohol, the fluid evaporated until a slight crop of crystals formed on cooling; the fluid poured off from these was again evaporated until a deposit ensued on cooling, and this process was repeated until the crystals thus formed exhibited a constant fusing point, viz. 43° C. It thus appears that *lauric acid* is an ingredient of this wax. The 10th fraction which was fluid at ordinary temperature was found by similar treatment to consist almost entirely of *lauric ether* formed by prolonged contact with alcohol.

About one pound of the crude fatty acids was repeatedly agi-

tated with small quantities of boiling alcohol until the fusing point of the portion undissolved, remained constant at 62° C. The several alcoholic solutions thus obtained were then mixed and evaporated to the point at which crystals formed on cooling, the whole allowed to cool to the ordinary atmospheric temperature, the crystals thus formed removed, and the process repeated several times, by which means a still further portion of the least soluble substance was removed. The fluid filtered from the crystals was now treated with caustic potash and after addition of water the whole was heated until no more alcohol could be expelled. The precipitate obtained by treating this solution with sulphuric acid, was dissolved in alcohol and subjected to a fractional crystallization to remove palmitic acid, by which means a sufficient quantity of the substance fusing at 43° C. was obtained for an elementary analysis.

The two substances thus obtained, and which from their fusing points and other characterististic properties were pronounced to be respectively palmitic and lauric acids, were further purified by solution in alcohol, decolorization by animal charcoal, resaponification, decomposition of the soaps by acids, and careful washing with distilled water, by which means they were obtained in a state of nearly absolute purity.

The above operations were very much complicated by the fact of the strong tendency of lauric acid to form an ether when left for any length of time in contact with alcohol. In this respect it far surpasses palmitic acid. A mixture of these two acids in which there was a great preponderance of the latter, was digested for several days in alcohol at the ordinary temperature of the atmosphere. Upon adding a weak solution of potash to remove uncombined acid, and finally washing with water, an oily fluid was obtained which became solid by a very slight decrease in temperature, and which upon examination turned out to consist of nearly pure laurate of oxyd of ethyl. This ether could only be decomposed by prolonged digestion at a moderate heat with a very concentrated solution of fixed caustic alkali.

The palmitic and lauric acids obtained in the preceding operations were subjected to combustion with oxyd of copper and oxygen gas, with the following results:

0·1967 grms. palmitic acid gave 0·54 grms. carbonic acid and 0·228 grms. water.

		Theory.		Experiment.
C_{32},	. .	192	75·00	74·96
H_{32},	. .	32	12·50	12·87
O_4,	. .	32	12·50	....

0·1857 grms. lauric acid gave 0·4917 grms. carbonic acid and 0·202 grms. water.

		Theory.		Experiment.
C_{24},	. .	144	72·00	72·21
H_{24},	. .	24	12·00	12·06
O_4,	. .	32	16·00	....

A portion of the crude wax was repeatedly treated with fresh quantities of boiling alcohol until no further solution ensued, the residue was several times crystallized from hot ether, and finally, after decolorization with animal charcoal, maintained in a state of fusion for some time to remove volatile impurities derived from the ether. It possessed the fusing point, hardness, and other properties of pure *palmitin*. Since, according to Bostock, boiling alcohol dissolves only four-fifths of the wax, the amount of palmitin present may be approximately stated at one-fifth of the whole.

The results of the foregoing experiments indicate that the wax of the *Myrica cerifera* consists of about *one-fifth* part of *palmitin*, the remaining *four-fifths* being free *palmitic acid* with a small quantity of *lauric acid*, the latter either free or in the state of *laurin*.

With regard to the uses of this substance, its composition and abundance suggest it to the chemist as the most convenient and accessible source of pure palmitin and palmitic acid, and it will probably be the means of increasing in no small degree our knowledge of these bodies and their derivatives. As a substitute for beeswax in the manufacture of candles, the myrica wax appears to be worthy of more attention than it has yet received. In illuminating power it seems to be scarcely, if at all, inferior to the best beeswax. It can be furnished at less than one-fourth of the cost of the latter material, and owing to its superior hardness it can be cast, instead of having to be subjected to the tedious and expensive process of moulding by hand. By care in

preparation, it can be obtained more free from color than crude beeswax, and moreover, it is said to be rendered perfectly white by the ordinary modes of wax bleaching. It might probably be used also with advantage to harden paraffine candles.

Taking into consideration the abundance of the plant itself, its hardy habits of life—in fact it thrives best upon soils which from their poverty and proximity to the sea are unfitted for all other purposes of cultivation—the slight degree of attention required to insure abundant crops, and finally the ease of extraction of the wax itself, there appears to be no reason why the preparation of myrtle wax should not constitute an important branch of manufacturing industry.*

The foregoing investigation was undertake at the suggestion of Prof. Johnson, for whose guidance and assistance I here take pleasure in expressing my grateful acknowledgments.—*Am. Jour. Sci. and Arts, May*, 1862.

ON THE PRODUCTION AND SEPARATION OF METHYLAMINE.

By M. Carey Lea.

In a previous paper I have pointed out that ammonias in which hydrogen is replaced by methyl are obtained by the action of nitrate of methyl upon ammonia at ordinary temperatures. Nitrate of methyl,† obtained by the distillation of methylic alcohol with nitric acid and urea, is placed in well stoppered bottles filled only about one quarter, together with a little more than its own bulk of thoroughly saturated aqueous ammonia, and is left till the nitrate of methyl disappears, or until only a few brown oily drops remain, a reaction which requires from three to six days, according to the temperature. The

* In course of the preceding investigation a property of the *palmitate of silver* was noticed which I believe has not yet been placed on record. I allude to its becoming powerfully electric by friction. A small quantity of this salt, purified from extraneous fatty matters by digestion of ether, was gently rubbed in an agate mortar, when a sufficient amount of electricity was generated to cause the powder to fly out in every direction and cluster around the pestle and the hand holding it.—G. E. M.

† See page 223, Amer. Jour. Pharm., May, 1862.

liquid is then distilled with caustic alkali, and the gaseous products are conducted into water.

In the solution we should by analogy expect to find ammonia, methylamine, dimethylamine and trimethylamine, and it remains to separate these bases. This is a matter of extraordinary difficulty, much surpassing that of the separation of the ethyl bases. In the ethyl series the bases differ from each other and from ammonia by C_4H_4, whereas in the methyl series the successive terms acquire the addition of C_2H_2 only. Naturally, therefore, we must look for greater similarity in character and corresponding difficulty in separation. Accordingly, the methods which give such satisfactory results with the ethyl-ammonias, fail entirely with the methyl bases. Ammonia cannot be separated from them by a difference in the solubility of the sulphates in alcohol: when the mixed solution is neutralized with sulphuric acid and exhausted with alcohol, little or nothing is removed by it. Nor can the separation be effected by means of picric acid, although that substance may be used in one particular case mentioned below.

This problem I have as yet been able to resolve only in part. Two steps I have accomplished:—first, the complete removal of the ammonia from the mixed methyl bases, and second, the isolation of the methylamine in a state of purity. The separation of the more substituted bases still remains to be accomplished.

It is, however, satisfactory to have a process for obtaining perfectly pure methylamine without resorting to the troublesome reaction of the cyanate of methyl, and that much has been effected. After the compound ether has been completely decomposed by the ammonia, the contents of the bottles are to be distilled with caustic alkali or lime. The solution of the mixed bases and of ammonia is to be exactly neutralized with oxalic acid and the water driven off as far as possible by being heated over the water-bath. The resulting mass is transferred to a flask, and boiled a few minues with a large quantity of alcohol of density 42° B., and after cooling and standing some hours, it is filtered. The whole of the ammonia remains as oxalate upon the filter. The filtrate by spontaneous or gentle evaporation separates into two layers. The lower, which is much the least

in quantity, becomes very soon crystalline; indeed this change takes place so rapidly that the fluid stage may easily pass unnoticed. More oxalate of methylamine remains in the mother liquid and separates on further evaporation.

After the fluid has crystallized, the resulting pearly white laminæ are purified by boiling with absolute alcohol, or with a mixture of equal parts of alcohol of 42° B. and ether, and this is repeated three or four times, allowing a thorough cooling to take place between each operation. The oxalate of methylamine finally crystallizes out quite pure, and methylamine may be obtained from it directly by distillation with caustic alkali. But the distillation is extremely unpleasant, exhibiting the phenomenon of percussive ebullition to such a degree as to endanger the whole apparatus, and to drive the liquid out of the Woulfe's bottle in strong jets through the safety tube. It is therefore advisable to treat the oxalate with nitrate of baryta or chloride of barium, leaving them in contact for a day, to evaporate the filtrate and then distill. I give the preference to the nitrate of baryta, because the nitrates of the ammonias distill more quietly than any of the others of these salts.

The methylamine thus obtained was converted into chloroplatinate and analyzed.*

1·0105 grms. gave of Pt,	. . .4216	
This corresponds to, per cent,	.	41·72
Theory requires for C_2H_3 H H H $\}$ NCl, $PtCl_2$,		41·62

The residue, after the greater part of the oxalate of methylamine had crystallized out, was evaporated, exhausted with absolute alcohol, treated with nitrate of baryta, distilled with caustic soda and neutralized with picric acid. From this solution there crystallized out beautiful amber-colored bevelled prisms and hexagonal plates greatly resembling the picrate of ethyl-

* It is scarcely necessary to observe that if platinum salts are recrystallized, the result of their analysis cannot be taken as a proof of the accuracy of the mode of separation used. In the analyses here published care was taken to use in all cases an excess of bichloride of platinum, and to include the whole precipitate in the analyses.

amine and apparently isomorphous with it. These were converted into chloroplatinate and analyzed with the following result.

·7265 grms. chloroplatinate gave of Pt,	.	·3025
This corresponds to, per cent,	. .	41·65
Chloroplatinate of methylamine contains,	.	41·62

The substance was therefore picrate of methylamine.

The residue appeared to be a mixture. Analyses of different portions, from different crystallizations gave respectively 39·85, 40·14, and 40·23 per cent. of platinum in the chloroplatinate, nor could any satisfactory means of separation be found.—*Amer. Jour. Sci. and Arts, May*, 1862.

ON COLCHICIN.

By Prof. G. F. Walz.

From a lengthy paper, the continuation of which is promised, we make the following extracts:

The author in the presence of Mr. Hesse one of the discoverers of colchicin, obtained this bitter principle in small, white, oblique, rhombic crystals, possessing neither acid nor alkaline reaction, soluble in water and alcohol, less in ether, permanent in the air, and of a bitter taste. The crystallization is difficult: the mother liquor separates at first floccules, which in four to six days change into shining crystals, sinking to the bottom after two or three days. Now they must be separated, or else they will disappear again in a few days.

Colchicin contains nitrogen. Dissolved in water, it turns yellow, but remains clear with dilute sulphuric acid; on boiling, floccules were separated, and the filtrate contained sugar, but no bitter principle. On neutralizing with carbonate of potassa, darker color was produced, and a considerable white flocculent precipitate. The filtrate therefrom was evaporated to dryness, and treated with alcohol and diluted alcohol; both solutions left on evaporation shining yellowish brown residues separating with water white floccules. The precipitate by potassa dissolves in alcohol with brownish yellow color, and the solu-

tion dries to an amorphous shining mass, not entirely soluble in dilute sulphuric acid. The above precipitate obtained on boiling with sulphuric acid, was dissolved in warm alcohol, from which it separated in the form of shining small needles in radiating groups.

The products of splitting of colchicin appear to be colchicein, resin in yellow scales, body precipitated by potassa, matter soluble in water, resinlike body insoluble in ether.

The following are the reactions of solid colchicin and of its solution in 20 parts of water:

Sulphuric acid colors it yellow and dissolves it without decomposition; on heating, decomposition takes place.

Nitric acid of 1·50 sp. gr. dissolves it greenish yellow, the fumigating acid with a deep violet color approaching indigo blue, finally yellow.

Muriatic acid of 1·161 sp. gr. similar to sulphuric acid.

Dilute sulphuric or muriatic acid produces with the solution a yellow color; on heating, decomposition.

Dilute nitric acid yellow color; on heating, deep orange and finally turbid.

Alkalies, their carbonates and the alkaline earths produce a yellow color, but no precipitate.

Ferric chloride, a deep color, no precipitate.

Acetate and subacetate of lead, sulphate of copper, ferrocyanide, ferridcyanide and sulphocyanide of potassium, acetic acid, chlorine water, chlorine gas and iodine water cause no precipitate.

Protronitrate of mercury, after 8 hours, a strong yellowish brown precipitate.

Corrosive sublimate, a white gelatinous precipitate, soluble in more water.

Nitrate of silver, a white precipitate, soluble in water, partly reprecipitated on standing.

Terchloride of gold, a golden yellow precipitate, soluble in water.

Bichloride of platinum, after 8 hours, a small precipitate.

Chromate of potassa no reaction; after the addition of sulphuric acid a reddish color.

Tannin, from very dilute solutions a precipitate, caking together on heating into a resinous mass.

Tincture of iodine, a strong kermes colored precipitate.

Bromine water, a large white precipitate insoluble in water.

2 drachms of colchicin yield scarcely enough colchicein for a few elementary analyses.—(*N. Jahrb. d. Ph.* xvi. 1–8.)

J. M. M.

ON THE DETECTION OF ARSENIC BY COPPER.

By H. Reinsch.

The following communication was published in Erdman's Journal für technische Chemie, lxxxii. 286: "In the Smethurst poisoning case, which was lately disposed of in London, the accused was acquitted in consequence of differing opinions of the two experts, basing their opposing views upon the employment of one and the same method, namely, Reinsch's test. This, as is well known, is very delicate and reliable, if its requisite cautels are observed; the blackish grey coating of the copper, with its metallic lustre, is very characteristic, and still two chemists had obtained different results by this method. From the deposition of one, it appears that the substance to be tested for arsenic had been previously treated in hydrochloric acid solution with chlorate of potassa, and had given a negative result with Reinsch's test. If we do not admit the supposition, that the arsenic detected by the other chemist, had been expelled in the form of chloride, it must be granted that by this treatment the arsenic had been oxidized to arsenic acid. Although Reinsch, in describing his method, speaks only of arsenious acid, it appears as if the easy precipitation by copper from the muriatic acid solution had been also ascribed to arsenic acid, and this opinion is verified by the statements of analytical authorities (see Fresenius' Qualit. Analyse 10, Aufl. §132, No. 7.) A large number of experiments have convinced me that arsenic acid or arseniates in muriatic or sulphuric acid solution do not produce the grey metallic mirror upon bright copper, either in the cold after standing for months, or by boiling long continued, or repeated in short or long intervals, unless the arsenic acid be

present in considerable quantity. Therefore the coating of copper with a grey mirror, is the property of arsenious acid only, if but a minute quantity be present." The reporter W. now mentions several experiments, showing that arsenic acid is not, or but incompletely, precipitated by metallic copper, and that this indifference must operate against the employment of copper for the detection of arsenic.

These statements induced me to institute experiments on the behaviour of metallic copper to arsenic acid, reports of which I had the honor to lay before the meeting of the German Apothecaries' Association at Coburg. But I had not concluded my experiments, and several objections were made, which I then could not answer, for want of experiments, but propose to do now.

Regarding the behaviour of arsenic acid to metallic copper, the statements of the above chemists are evidently incorrect, though I admit that heretofore I had not experimented with arsenic acid, because my test was, first of all, intended for cases of poisoning with arsenious acid, as arsenic acid does not occur in commerce, and I know not of a single case of poisoning by it.

A very dilute aqueous solution of arsenic acid was mixed with half its volume of pure muriatic acid, and boiled with bright copper wire. Not the slightest precipitate of arsenic occurred, and the copper remained perfectly bright. No alteration of the copper could be observed, after increasing the muriatic acid to one volume. But after taking to one volume of the solution two volumes of concentrated muriatic acid and boiling, the copper was instantly covered with the characteristic grey layer of arsenic. This reduction takes place even in very dilute solution, and the reaction of arsenic acid is not less delicate than that of arsenious acid, if calculated for the proportion of metallic arsenic, a solution of which, containing 1·100000, yields still good results, and then the dilution with muriatic acid has not yet been calculated It seems, therefore, as if the English chemist failed with the reaction of arsenic acid simply from not having acidulated enough with muriatic acid. A liquid not very acid does not attack metallic arsenic, or but very slightly, and therefore no arsenic can be precipitated; but if the solution is sufficiently acid to dissolve the copper, the arsenic acid

will be reduced, and the precipitate takes place. Arsenious acid, however, is precipitated by copper even from faintly acidulated solutions.

It is difficult to conceive why, in the above case, the hydrochloric solution of arsenious acid was treated with chlorate of potassa. I have made about twenty experiments with arsenious and arsenic acid dissolved in muriatic acid, which, when treated with very small quantities of chlorate of potassa, gave sometimes no reaction whatever, with copper. I cannot explain this, except by assuming that thereby a very volatile superchloride of arsenic is formed, which is readily volatilized on boiling. The use of chlorate of potassa must, therefore, be strictly avoided.

Attention must be directed to still another precaution, namely, to treat only lukewarm with muriatic acid, the stomach and other substances to be tested for arsenic,—otherwise chloride of arsenic will be volatilized. It appears advisable to extract the substances in a flask with muriatic acid, which may be diluted with an equal bulk of water, and to collect the vapors in a separate vessel, so as to lose no trace of the arsenic. If arsenious acid is heated gently in a retort with muriatic acid, without boiling the liquid, oily drops of terchloride of arsenic and very strong muriatic acid are distilled over; the former, it appears, volatilizes readily in connection with gaseous muriatic acid.

In the beginning of these experiments I was of the opinion that arsenic acid could not be precipitated by copper, and I endeavored to reduce it previously to arsenious acid, which is easily accomplished by a current of sulphurous acid, and heating subsequently to boiling. A concentrated solution of arsenic acid thus heated, deposits on cooling arsenious acid in fine octohedrons, and contains no arsenic acid.

Lippert states (Am. J. Ph. 1861, 408) that the deposit upon copper consists of Cu_5As. Though I had at first supposed it to be pure arsenic, I have subsequently proven that it retains copper, and succeeded afterwards to separate it from copper by means of ammonia. I must suggest, however, whether this precipitate from arsenious acid might not more likely be $AsCu_3$, and the precipitate from the arsenic acid solution $AsCu_5$,

corresponding in composition with the precipitates obtained by sulphuretted hydrogen; experiments which I have commenced, may clear this up. The suggestion of Lippert, that other metals are similarly precipitated by copper, appears probable for antimony, and perhaps for bismuth, which is precipitated in crystals, but most likely not for silver and mercury; but tin and lead, though enumerated among the others by Lippert, are not precipitated at all by copper from their solutions acidulated with muriatic acid.

In answer to the objections made at the meeting of the Association at Coburg, that all commercial copper contains arsenic, I have to state that I have never found this metal in the wire which I employ for my test. The wire is ½ millimetre in thickness, and is invariably heated to redness for several hours, enclosed in a box, subsequently, it is well scoured. Mere traces of arsenic render copper very brittle, so as not to be fit for fine wires, and these I consider almost pure copper, containing but traces of lead, silver and iron. The brittleness of sheet copper even is generally due to iron, and arsenic will probably rarely be found in minute traces. But even if the copper should contain arsenic, it could not be dissolved on boiling with muriatic acid, because the latter metal is then in an electro-negative condition. However, with the tests as proposed by me, the absolute absence of arsenic is proven by boiling for some time the copper wire with the muriatic acid, when the former must remain bright.

Another objection to my test was, that green colors which have recently appeared in commerce, yield a reaction similar to the arsenical colors. Blue or green ultramarine, when treated with muriatic acid, disengage much sulphuretted hydrogen, and leave a gelatinous greyish white mass. If ultramarine was adulterated with a copper arsenic color—the latter, however, are much dearer—the color would not disappear, and the solution would be of a green or brown color. Copper arsenic colors adulterated with ultramarine would turn brown, and evolve with muriatic acid sulphuretted hydrogen. The solution of ultramarine in muriatic acid colors copper blackish blue, sometimes steel blue, by a sulphur compound, which is not decomposed by a large excess of muriatic acid and long continued boiling, but

reacts, even when considerably boiled, with the metallic copper. If sulphuretted hydrogen is passed through muriatic acid, metallic copper will assume in the liquid a brown color, which disappears on boiling, leaving the copper bright; but long continued boiling will not remove the bluish black deposit in the above solution of ultramarine, and after the boiling has ceased, no gas bubbles will rise from the blackened copper. Copper, with a precipitate of arsenic deposited upon its surface, becomes positive electric, and dissolves now freely in the warm muriatic acid with the evolution of hydrogen, and may thereby be readily distinguished from the copper blackened by sulphur. Indeed, I have thereby discovered, and afterwards proved by other reagents, the presence of arsenic in samples of ultramarine. The latter being prepared by calcination of Glauber's salt, charcoal and clay, the source of arsenic is evidently the sulphuric acid; and though its proportion may be very minute, it must not be overlooked in forensic analysis. It must be remarked, however, that but little of the arsenic is dissolved by the hydrochloric acid, the greater portion remaining with the insoluble residue as sulphide of arsenic.

Of what nature the sulphur compound in ultramarine and in sulphuret of calcium may be, which is not decomposed by boiling muriatic acid, but produces the stated peculiar reaction with copper, cannot be decided yet: it is, however, decomposed by chlorate of potassa.—*N. Jahrb. d. Ph.* xvi. 135—143.

J. M. M.

PROCESS FOR THE EXTRACTION AND INVESTIGATION OF POISONOUS ALKALOIDS.

By MM. V. Uslar and J. Erdmann.

Many difficulties attend the extraction of an alkaloid when, as in medico-chemical researches, it is associated with other organic matters. The following is a method recommended both by its simplicity and its generality. It is founded on the following facts:—

1. Free vegetable alkaloids are soluble in amylic alcohol, especially by aid of heat.

2. Pure or alkaline water does not remove the bases thus dissolved; but,

3. It separates them completely when it has been previously acidulated with hydrochloric acid, the organic chlorides which are formed being almost insoluble in amylic alcohol.

The following is the method of operation:—Reduce the suspected matter into a pulp with water, slightly acidulated with hydrochloric acid. Then leave it to digest for two hours at a temperature of from 60° to 80° C.; pass a wet cloth over it, and exhaust the residue with acidulated warm water, and after mixing the liquids add a slight excess of ammonia; concentrate over an open fire, and dry in a water-bath. After exhausting the residue with warm amylic alcohol, filter it through a paper previously moistened with amylic alcohol.

The filtered product is generally mixed with fatty or coloring matters, which must be eliminated by quickly shaking up the liquid with almost boiling water, acidulated with a little hydrochloric acid. The amylic alcohol then yields the alkaloid, while it retains the greater part of the fatty or coloring matters. Draw it off by a small india-rubber pipe,* then shake the warm aqueous liquid with a fresh supply of amylic alcohol, and the foreign matters will be got rid of without much trouble, so that the acid solution containing the alkaloid in the state of hydrochlorate is completely decolorised. Slightly concentrate this solution, add a slight excess of ammonia, and then amylic alcohol, which after repeated shakings takes up the alkaloid.

After duly separating the two layers of liquid, withdraw the upper one, containing alcohol and alkaloid, and attack the lower layer by adding a fresh portion of warm amylic alcohol; then mix the alcoholic liquids and evaporate them by a water-bath, and the residue is generally pure alkaloid. If it has preserved its color, the operator need not continue the operations just described; that is to say, dissolve in hydrochloric acid, shake with amylic alcohol, and draw off by a small pipe; supersaturate with ammonia, shake with amylic alcohol, and eliminate it by evaporation in a water-bath.

* This precaution is essential to prevent the inhalation of the vapors of amylic alcohol.

It is very seldom that the alkaloid is not completely purified by this treatment; should it not be, the process must be repeated.*

The authors have verified their process in various ways. Hydrochlorate of morphine mixed with panada, or putrid meat, exposed to the sun for fifteen days, was integrally detected by the special reaction it gives with sesquichloride of iron; nevertheless, the experiment was tried with less than a decigramme of hydrochlorate, mixed with 1 or 2 kil. of organic matter. The different portions employed varied between 0·054 grammes and 0·005 grammes.

They have also recovered a drop of nicotine and two drops of coniine respectively added to 750 grammes of panada.

The same with 9 milligrammes of strychnine, 8 milligrammes of narcotine, as well as with a mixture formed of 0·012 grammes of morphine and 0·013 grammes of narcotine mixed with a pulp of vegetables and meat, and left for four days to putrefy.

The alkaloids when recovered were separated from each other by ether.—*Chem. News, London*, April 26th, 1862.

ON THE OCCURRENCE OF BERBERINE IN XANTHORRHIZA APIIFOLIA.

By J. Dyson Perrins, F.C.S.

Having lately observed the presence of Berberine in *Hydrastis canadensis*, it appeared to be worth while to ascertain whether this alkaloid also occurred in *Xanthorrhiza apiifolia*, another North American plant, which belongs to the same natural order, Ranunculaceæ. Professor Bentley having announced his early intention of describing the botanical characteristics, properties, uses, etc., of *X. apiifolia*, any account here is rendered

* To all acquainted with the alteration produced in nicotine and coniine by the presence of air, it will be difficult to understand how alkaloids can escape the causes of decomposition to which they are exposed during this process, which not only does not protect them from the action of the air, but exposes them to it in presence of ammonia at the temperature of a water-bath.

unnecessary. Suffice it to say, that the root is of a fine yellow color, and popularly called in the United States, "Yellow root." I was indebted to the courtesy of Daniel Hanbury, Esq., for a specimen of this root; but finding a large quantity would be required for my purpose, and failing to meet with it in this country, I obtained a supply from a correspondent in New York.

The mode of treatment adopted was extremely simple, viz:—Exhausting the bruised root with boiling water, and evaporating the liquid to a soft extract, which was digested in boiling alcohol so long as anything was dissolved; the greater part of the alcohol was distilled off, and a little dilute nitric acid added to the residue; after standing for a day or two, fine crystals had formed, which were purified from resin and other matter by repeated crystallizations from water, with the cautious use of animal charcoal, always adding a few drops of dilute nitric acid to the liquid, which I prefer to hydrochloric acid; the pure salt finally consisted of fine acicular yellow crystals.

All the known reactions of Berberine were manifested; but in order to place the matter beyond dispute, the following analyses were made. The nitrate, as above described, was crystallized from water to get rid of any possible traces of free acid, dried at a temperature of 212° Fahr., and burned with chromate of lead.

No. 1. 5·002 grains gave 11·032 grains carbonic acid and 2·058 grains water.

No. 2. 5·213 grains gave 11·504 grains carbonic acid, and 2·149 grains water.

	No. 1.	No. 2.	Fleitmann.
Carbon, per cent. . .	60·15	60·18	60·15
Hydrogen, ...	4·57	4·58	4·75

Some of the platinum salt was also prepared, dried at 212° Fahr., and burned with lead chromate.

6·132 grains, gave 9·981 grains carbonic acid, and 1·882 grains water.

10·243 grains, burned with soda lime, gave 4·300 grains ammonio-chloride of platinum; 8·516 grains gave, on ignition, 1·544 grains platinum, which figures correspond with the following percentages:—

		Fleitmann.
Carbon . . .	44·39	44·44
Hydrogen . . .	3·41	3·42
Nitrogen . . .	2·59	2·52
Platinum . . .	18·13	18·11

These results prove satisfactorily that Berberine occurs in *X. apiifolia*, thus adding another source for this very beautiful alkaloid. The amount present is not large; seven pounds avoirdupois yielded only fifty-two grains of the pure nitrate.—*Lon. Pharm. Jour. May*, 1862.

METALLIC COPPER THE MOST DELICATE TEST FOR SULPHUROUS ACID.

By H. Reinsch.

My last paper on my test for arsenic* contained the statement that the acid liquid obtained by treating ultramarine with boiling hydrochloric acid, blackens metallic copper; the same result was had with a solution of sulphide of calcium in muriatic acid. This reaction I supposed, at first, to be produced by a peculiar sulphur compound as hyposulphites and sulphites ought to be decomposed by boiling muriatic acid; but a long series of experiments render it certain that it is due to sulphurous acid. This reaction is so delicate that the most minute traces which cannot be detected in any other way, are thus shown.

If a few bubbles of sulphurous acid are conducted into half an ounce of muriatic acid, and two drops of this acid are mixed with twenty ccm. of water and ten ccm. of pure muriatic acid, it will on boiling color copper wire brown, and the wire has after some time the appearance as in the presence of arsenic. In the presence of more sulphurous acid, the wire during the boiling appears deep brown-black, and stains the fingers. Air containing but traces of sulphurous acid, passed through muriatic acid, causes an evident reaction with metallic copper. To detect very minute traces of sulphurous acid, it is advisable to make two experiments, one with pure muriatic acid, in which the copper wire on boiling will show a golden lustre, while in the pres-

* See page 350 of this Journal.

ence of traces of sulphurous acid, the wire loses its brightness, and turns after some time faint reddish, afterwards grey or brown.

When testing for arsenic it is necessary to bear in mind this reaction of sulphurous acid in the presence of muriatic acid. Sulphuric and muriatic acid frequently contain traces of sulphurous acid, and may therefore lead to mistakes with arsenic. All the sulphur acids containing less oxygen than sulphurous acid, will necessarily produce the same reaction. But while the precipitate by arsenic adheres to the copper, and does not stain the fingers, the deposit produced by the sulphurous acid colors the skin black; the former, on being shaken with a few drops of ammonia, separates in fine scales and leaves the copper bright, which is not the case with the latter.

The most apparent difference in the behaviour of the two precipitates is that towards a boiling mixture of equal volumes of muriatic acid and water, which dissolves the former with evolution of hydrogen, but not the latter, which will retain its black color. The precipitate by arsenic on being thus treated, yields at first a white crystalline ring of arsenious acid, and the copper appears silver-white from a coating of arsenico-copper; on continuing the heating the whole of the arsenic will be volatilized and the copper regains its original color.

Water containing sulphurous acid does not react with copper either on boiling or at ordinary temperature; on the addition of muriatic acid, the reaction takes place. Sulphites behave in the same way. It is remarkable that this reaction is produced only by muriatic acid (probably also by the hydracids of the other halogens.) If sulphuric acid be used no such reaction takes place, but after the addition of a grain of table salt, the copper becomes dim and soon reddish. It seems probable, therefore, that under certain conditions this reaction might be useful for the detection of chlorides; it will at least assist in explaining these phenomena.

This method of recognizing sulphurous acid by copper, is useful for detecting sulphurated hops. One strobile is macerated with water for half an hour, the infusion is mixed with an equal volume of muriatic acid, and the mixture boiled with copper wire; in a few minutes, a faint but evident reaction was ob-

served; while no alteration was observable on treating fresh hops in a like manner.—*N. Jahrb f. Pharm.* xvi. 227–280.

J. M. M.

ON HYDRASTINE, AN ALKALOID OCCURRING IN HYDRASTIS CANADENSIS.

By J. Dyson Perrins, F. C. S.

The substance hitherto known as Hydrastin in the Eclectic school of American pharmacy proves to be little more than impure berberine; it therefore appears to me that the term *hydrastine* may, with great propriety, be transferred to another alkaloid, which I have recently observed in *H. canadensis*. I have been acquainted with the occurrence of berberine in this plant for some time past. It was observed in pursuing an inquiry which is still incomplete, and therefore has not yet been published. Dr. Mahla, of Chicago, to whom priority of publication is due, has announced this source for berberine in 'Silliman's Journal,' for January, 1862. I can entirely corroborate his conclusions, and add, that hydrastis proves to be an excellent source for berberine. I have obtained from it four per cent. of the crude muriate.

To obtain the new alkaloid, it is advantageous to bear in mind that berberine is difficultly soluble in the dilute mineral acids, especially in dilute nitric acid, and that hydrastine, readily soluble in acids, is insoluble in alkaline solutions; to prepare it, the mother liquor, largely diluted after the separation of the berberine, may be used: this should be rendered as free as possible from alcohol, and solution of ammonia cautiously added until a precipitate *just begins* to appear and remains constant upon stirring; this consists principally of dark-colored resin, previously held in solution by the excess of acids; then filter, and to the filtrate add a slight excess of ammonia; the hydrastine now falls as a fawn-colored precipitate, which should be collected and washed with cold water. Under the microscope it now presents the appearance of spherical granules, very like wheat-starch. I have observed that this precipitate when pressed between porous tiles, and put aside for a few hours, undergoes a remarkable molecular change, becoming decidedly

crystalline; to purify the substance, dissolve with heat in alcohol of eighty per cent., or perhaps preferably in proof spirit, and filter while hot: upon standing for a few days, the greater part of the alkaloid will crystallize out, more or less colored; to render it quite pure, repeat this treatment with the addition of a little animal charcoal until the crystals are colorless. They are now four-sided prisms, and of great brilliancy, but they lose this transparency after they are dried. The yield is about 1·5 per cent. of the dried root operated on.

Hydrastine contains nitrogen, and appears to be a powerful organic base, combining perfectly with acids, and forming the usual double salts with mercury, gold and platinum. Hydrastine is nearly insoluble in water, but readily soluble in alcohol, ether, chloroform and benzole; indeed, it may be obtained by treating the powdered root in a displacement apparatus with either of the three latter solvents, which are without action upon berberine.

The greater part of the salts of hydrastine appear to be readily soluble in water; so far as I have observed, the phosphate and the iodate are the least so: the carbazotate is not very soluble in proof spirit, and it may be easily obtained in radiating groups of yellow silky needles, often arranged after the manner of wavellite.

Hydrastine melts to a clear colorless resin at a few degrees above 212° Fahr.

Hydrastine, and especially its soluble salts, have a bitter and acrid taste, followed by a sense of numbness, which is not severe, but nevertheless is well marked; whatever the physiological effects of this alkaloid may prove to be, it cannot, I think, be classed amongst the poisons, as five grains given in solution to a full-grown rabbit produced no other effect than a slight uneasiness, which passed off in the course of an hour or two.

Crystals of hydrastine touched with concentrated nitric acid merely give rise to a yellow-brown coloration, which is not very noteworthy, but with sulphuric acid and an oxidizing agent the result is different; with sulphuric acid and bichromate of potash, or peroxoide of lead, a coloration is produced varying from a brick-red to a light but pure crimson, certainly distinct from the deep purple yielded by a crystal of strychnine, but so

nearly allied to the tints sometimes obtained from mere *traces* of strychnine as to render it desirable that this color-test should be remarked upon.*

The degree of attention just now bestowed upon the American remedies of the Eclectics, is my apology for noticing this alkaloid in the incomplete manner which I have here ventured to do, before I have had sufficient opportunity of studying its composition, or of presenting a formula for the acceptance of chemists. Still, as supplementing the paper of Professor Bentley upon *Hydrastis canadensis*, I hope this notice may not be without interest even in its present form.

[Since transmitting the foregoing paper to the Pharmaceutical Society, I have had, through the kindness of Professor Bentley, an opportunity of seeing an essay on *Hydrastis canadensis*, by Durand, which appeared in the American "Journal of Pharmacy," vol. xxiii. v. 112, (1851.) Durand's examination of this root is not very satisfactory. He appears to have overlooked the presence of berberine altogether, but seems to have obtained crystals, which were probably hydrastine, and noted some few of their properties; yet he says he is in doubt as to their nature, his experiments not being sufficiently conclusive to enable him to pronounce thereon. I was not aware there had been any previous notice of this substance until my attention was called to Durand's Essay by Professor Bentley, and it is remarkable that so promising a body should not have been further examined, during a period of more than ten years.—J. D. P.] —*Lond. Pharm. Jour. May*, 1, 1862.

THE SARRACENIA PURPUREA, A REMEDY FOR SMALL-POX.

To the Editor of the American Medical Times:—

SIR:—You have by this time, in all probability, heard something of an extraordinary discovery for the cure of small-pox, by the use of "Sarracenia purpurea," or Indian Cup, a native plant of Nova Scotia. I would beg of you, however, to give full publicity to the astonishing fact, that this same humble bog-

* The addition of chlorine water to solutions of hydrastine salts, gives rise to an appearance of blue fluorescence, comparable to that seen in acid solutions of quinine.

plant of Nova Scotia is the remedy for small-pox, in all its forms, in twelve hours after the patient has taken the medicine. It is also as curious as it is wonderful that, however alarming and numerous the eruptions, or confluent and frightful they may be, the peculiar action of the medicine is such that very seldom is a scar left to tell the story of the disease.

I will not enter upon a physiological analysis now; it will be sufficient for my present purpose to state, that it cures the disease as no other medicine does—not by stimulating functional re-agency, but by actual contact with the virus in the blood, rendering it inert and harmless, and this I gather from the fact that if either vaccine or variolous matter be washed with the infusion of the Sarracenia, they are deprived of their contagious properties. The medicine, at the same time, is so mild to the taste that it may be mixed largely with tea or coffee, as I have done, and given to connoisseurs in these beverages to drink, without their being aware of the admixture.

Strange, however, to say, it is scarcely two years since science and the medical world were utterly ignorant of this great boon of Providence; and it would be dishonorable in me not to acknowledge that had it not been for the discretion of Mr. John Thomas Lane, of Lanespark, County Tipperary, Ireland, late of Her Majesty's Imperial Customs of Nova Scotia, to whom the MecMac Indians had given the plant, the world would not now be in possession of the secret. No medical man before me had ever put this medicine upon trial; but in 1861, when the whole Province of Nova Scotia was in a state of panic, and patients were dying in the hospitals at the rate of twelve and a half per cent., from May to August, Mr. Lane, in the month of May, placed the "Sarracenia" in my hands to decide upon its merits; and after my trials then and since, I have been convinced of its astonishing efficacy.

The Indian Cup is found in swamps and moss bogs. Its capacious globular receptacles are generally filled with cool, bland water. The Cups are lined with bristles, pointing downwards, that entangle the flies that come to drink, so that few escape drowning. It is a very curious and remarkable family of plants, exclusively North American, and not to be met with west of the Alleghanies. The leaves take the form of a long bulbous tube

or funnel, like the bowl of a tobacco-pipe, terminating with a hood-shaped appendage not unlike an Indian squaw's cap. The flowers, with their hard involuted crenate calyx, and fine sessile segments, like the yellow water-lily, deep crimson stigmata, and corresponding stamina, in form and appearance are very remarkable. All of the tribe inhabit marshy grounds. The "Sarracenia Purpurea" is the most common species, and like all the beautiful things of Providence, widely diffused from Hudson's Bay to the State of North Carolina.* The root consists of numerous short radicles, fibrous and stringy, which, when powdered, have a very faint and agreeable aroma, with a taste very like the willow alkaloid, or salicin. The dose of the medicine —the powdered root—is about a dessert-spoonful, simmered in a pint of water down to half a pint; this is divided into two doses, one taken immediately, the other in six hours; no sugar should be given with it. The only functional influence it seems to have, is in promoting the flow of urine, which soon becomes limpid and abundant, and this is owing perhaps to the defecated poison or changed virus of the disease exclusively escaping through that channel. The "Sarracenia," I take reason to believe a powerful antidote for all contagiousdiseases, lepra,measles, varicella, plague, contagious typhus, and even syphilis, also a remedy in jaundice. I am strongly inclined to think it will one day play an important part in all these. Yours, etc.,

FREDERICK W. MORRIS, M. D.,
Resident Physician of the Halifax Visiting Dispensary.

—*Am. Med. Times, May* 24, 1862.

CHLORIDE OF LIME AS AN INSECTICIDE.

In scattering chloride of lime on a plank in a stable, all kinds of flies, but more especially biting flies, were quickly got rid of. Sprinkling beds of vegetables with even a weak solution of this salt, effectually preserves them from the attacks of

* [The Sarracenia Purpurea grows in the swampy lands of New Jersey, and is called the "Pitcher plant," and "Side-saddle flower;" Griffith does not mention it in his "Medical Botany." Various southern species exist, and two of these are noticed in the U. S. Dispensatory.—ED. AM. JOUR. PHARM.]

caterpillars, butterflies, mordella, slugs, &c. It has the same effect when sprinkled on the foliage of fruit trees. A paste of one part of powdered chloride of lime and one-half part of some fatty matter, placed in a narrow band round the trunk of the tree, prevents insects from creeping up it. It has even been noticed that rats and mice quit places in which a certain quantity of chloride of lime has been spread. This salt, dried and finely powdered, can, no doubt, be employed for the same purposes as flour of sulphur, and be spread by the same means. —*Chem. News, London, from Dingler's Polytechnisches Journal.*

OILED PAPER, AS AN ECONOMICAL SUBSTITUTE FOR OILED SILK IN SURGICAL DRESSINGS.

During a visit to England and Scotland, in the summer of 1860, I noticed in the Glasgow Royal Infirmary that they used an *oiled paper* as a substitute for oiled silk, in surgical dressings. The article was invented by Dr. McGhie, the Superintendent of the Infirmary, and possesses many advantages besides that of being economical.

The following is the mode of preparation:—Take good "tissue" paper, free from holes, as many sheets as may be required; boiled linseed oil, say one quart; to which add one ounce sulphate of zinc, and re-boil for an hour or longer. A little beeswax and turpentine may be added, while the oil is hot. Use a square board, larger than the sheet of paper. Coat the first sheet on *both* sides with a paint or paste-brush; the rest of the sheets only require to be coated on one side, as the oil strikes through. Place the second sheet on the top of the first, slightly projecting at one end, for convenience of lifting, and so on, *seriatim*. When all the sheets are coated, hang them up to dry in a moderately warm place, for twenty-four hours. When taken down, each sheet may be dusted over with French chalk, which will prevent them from adhering. If sufficient wax and turpentine have been used in the mixture, the chalk dusting will not be needed.

Dr. McGhie, in his pamphlet, claims the following advantages for oiled paper as compared with silk:—

1. *Economy.*—A sheet costs from one to two cents only.

2. *Transparency and lightness.*—Applied over a stump or other cut surface, when hæmorrhage may be feared, the state of the part can be more readily seen. On account of its lightness, it is particularly useful in covering extensive burns.

3. *Adaptability.*—It can be nicely applied to any part, retaining the form impressed upon it. It is easily torn, while, at the same time, it can be made of any required strength by doubling or trebling it.

4. *Safety.*—The great objection to oiled silk (or even to gutta percha sheeting), is, that the expense tempts us to use it over and over again; and in this way disease is propagated. There would exist no such temptation with oiled paper, as it could only be used *once*, and all risk of contagion in this way would be avoided.—*Boston Med. and Surg. Journ., Feb.* 20, 1862.

W. S. B.

A NEW TEST FOR MORPHIA.

By M. Leforte.

This test is based on the following facts:

1. When organic substances decompose iodic acid, the liberated iodine is generally absorbed by caustic ammonia and the mixture is completely decolorized.

2. Morphia, on the contrary, which is decomposed by iodic acid and thereby colored red or brown, becomes still more intensely colored on the addition of caustic ammonia.

The following experiments show the extreme sensibility of the latter reaction:

An aqueous solution, containing one part of morphia in a hundred is colored dark yellow by iodic acid, which at once changes to a very deep yellowish brown on the addition of ammonia.

A solution of morphia containing one part in a thousand is colored lemon yellow, by iodic acid, and the mixture acquires the color of *Alicant* wine when ammonia is added.

In a solution containing one part in ten thousand, iodic acid produces only a slightly perceptible yellowish color, which however becomes quite apparent when a few drops of ammonia are added.

Instead of adding iodic acid and ammonia to the aqueous or alcoholic solutions of morphia, the author now proposes to obtain the solid alkaloid from the solution, in the following manner. A solution of morphia is placed in a porcelain dish and strips of white filtering paper are immersed in it. These are allowed to dry, and are then again immersed and allowed to dry as before. When, after repeated immersions and drying, all the solution has been absorbed by the paper, the morphia is found in the solid state fixed in the filtering paper, to which nitric acid, perchloride of iron and finally iodic acid and ammonia may now be applied, giving their several peculiar reactions with morphia in a sure and easy manner.—*Md. Col. of Pharm. from Repertoire de Pharm.*

ON THE CONSTRUCTION OF BASINS AND RESERVOIRS UNATTACKABLE BY MOST ACID OR ALKALINE LIQUIDS.

By M. H. Kalisch.

Unless by making use of wrought or cast iron (which have the inconvenience of being easily attacked by all acid liquids), it has been found very difficult to construct reservoirs capable of resisting the action of boiling solutions of caustic alkalies.

Most of the materials or luting proposed for this purpose are either much too easily acted on, or are too expensive for application on a certain scale.

The author proposes to line the sides of such stone reservoirs with plates or slabs of *heavy spar* (native sulphate of baryta), and to cement all the joints with a luting prepared in the following manner:—

Digest one part of india-rubber, in small pieces, with two parts of freshly rectified spirit of turpentine, until the mixture becomes perfectly homogeneous, then incorporate with it four parts of powdered sulphate of baryta.

Reservoirs constructed in this way ought to resist not only the corrosive action of boiling caustic alkalies, but most organic or inorganic salts,—for instance, sulphates, chlorides and nitrates of zinc, iron, copper, soluble glass, cream of tartar, &c., and boiling hydrochloric, phosphoric, boracic, oxalic, tartaric, and citric acids, and slightly diluted cold sulphuric acid.—*Chem. News, London, April* 12, 1862, *from Repertoire de Chimie.*

PREPARATION OF PURE NITRATE OF SILVER.

By M. Lienau.

Attack cupreous silver containing copper by nitric acid; to the solution, sufficiently concentrated, add chlorine water, freshly prepared, which precipitates the silver only. Then wash the precipitate in chlorine water, which prevents the chloride of silver from decomposing under the influence of light, and renders it more speedily soluble in solution of ammonia; when well washed, dissolve it in that liquid, and plunge into the solution a well cleaned copper-wire. As the copper dissolves, the silver is precipitated, and is deposited as a brown powder; the operation is at an end when the wire preserves its brightness after being washed in water.

To render the precipitated silver perfectly pure, it is only necessary to wash it in ammoniacal water.—*Ibid, from Archiv der Pharm.*

ON THE ALTERATION OF TINCTURE OF IODINE, AND THE MEANS OF PREVENTING IT.

By M. Dropet.

It is known that tincture of iodine does not long preserve its color, a portion of the iodine changing to hydriodic acid. M. Dropet endeavors to show that the hydrogen necessary for the reaction comes from the water, and not, as is supposed by other chemists, from the alcohol. Among other experiments, he has shown that a tincture prepared with almost absolute alcohol, 34 centigrammes out of 3 grammes of iodine, were in eighteen months transformed into hydriodic acid. Another tincture, prepared with the same proportion of alcohol at 95°, lost 41 centigrammes; and a third, with alcohol at 86°, 67 centigrammes. These tinctures were preserved together in a dimly-lighted cupboard. M. Dropet concludes that in making tincture of iodine it would be better, for two reasons, to replace the alcohol at 86° by that of 95°. In the first place, the tincture keeps better; in the second, it is made more quickly, since iodine is much more soluble in concentrated than in weak alcohol.—*Chem. News, London, May* 3, 1862, *from Repertoire de Pharmacie.*

(Continued from page 184.)

sumes a violet color. Reference must be made to these circumstances in the employment of perchloride of iron. The perchloride of iron itself is distinctly colored yellow in considerably diluted aqueous solutions. On this account, it is necessary to prevent any excess of this solution, as otherwise misconceptions will arise; for example, a blue coloration should be observed, but instead of it a green makes its appearance, because the blue coloration which the substance and the perchloride of iron produce is converted into green by the yellow of the solution of perchloride of iron which has been added in excess. Further, it is always convenient to add a little ammonia to the fluid which has assumed a distinct color with perchloride of iron, to observe the appearances which are thereby developed. The green or blue coloration is changed by perchloride of iron sometimes into a dark violet, sometimes into a black, and sometimes into a red. Thus the presence of two substances can be rendered evident, which behave in a free state quite the same as perchloride of iron.

2. *Perchloride of tin.*—The aqueous solution of perchloride of tin produces no coloration in the watery solutions of many substances, and also no precipitates; on the contrary, in the solutions of other bodies, a characteristically colored precipitate frequently results thereby, sometimes only after the addition of a little ammonia. Frequently, by heating a solution after the addition of perchloride of tin, a precipitation results which contains no longer the original substance, but a decomposition product of the substance combined with oxide of tin.

3. *Protochloride of tin.*—The protochloride of tin, as a powerful agent of reduction, produces, particularly at elevated temperatures, changes of color, which indicate the presence of a body which otherwise might have been overlooked. By this reducing action a colored fluid often results. In many cases the addition of a little free alkali assists considerably the action of the protochloride of tin.

4. *Nitrate of silver.*—By the watery solution of this salt a precipitate of a silver compound, insoluble in water, often results in solutions, particularly after the addition of a little ammonia. Many of these silver salts are almost immediately decomposed under the separation of metallic silver, others only under the influence of a higher temperature. The silver separates thereby sometimes as a shining mirror, sometimes as a pulverulent black mass. This varied behavior of the different constituents of vegetable substances to the solution of nitrate of silver, by the presence and absence of an alkali, permits the employment of this salt likewise for the detection of individual constituents in a mixture.

5. *Acetate of lead.*—The neutral acetate of lead is employed as a watery as well as a spirituous solution; for the latter spirit of specific gravity ·825 is used. The majority of organic substances are precipitated by sugar of lead from a watery or spirituous solution. One part of the lead compound, insoluble in spirit or water, dissolves in acetic acid: another

part does not. A part of the lead compound insoluble in water, dissolves in alcohol; on the contrary, a part of the lead compound, insoluble in spirit, dissolves in water. By the decomposition of lead compounds which are precipitated from their watery solutions by alcohol, and by the decompositions of lead compounds which are precipitated from their alcoholic solutions by water, the separation of substances is effected which were contained in the lead precipitates together at the same time. When the decomposition is performed with sulphuretted hydrogen, the sulphuret of lead, like charcoal, retains often one or more of the constituents, while other constituents pass over into the fluid in which the lead compound was diffused before treatment with sulphuretted hydrogen.

6. *Basic acetate of lead.*—In general, what has been stated of the neutral acetate of lead is applicable to this reagent. A number of substances which are not precipitated by the neutral salt, give insoluble compounds by the addition of subacetate of lead to their watery or spirituous solution. As many organic substances which have a great tendency to reduce the oxides of the noble metals, and in combination with alkalies and alkaline earths absorb oxygen from the air, form with lead compounds which are less subject to such changes. both the lead salts are more suitable, in many cases, than other metallic salts to effect the decomposition and separation of substances. Concerning the basic acetate of lead, it is particularly to be mentioned that it precipitates substances from acid solutions because it saturates the free acid, and is converted into the neutral salt. These substances are *per se* insoluble in the fluid, and are only dissolved therein by the agency of an acid, so that the precipitate may contain substances which do not form compounds with oxide of lead.

7. *Acetate of copper* can be used in many cases as the neutral acetate of lead, but seldom offers any advantage over it.

8. *Sulphate of copper* is employed in the same cases in which acetate of copper or acetate of lead is used, when the presence of acetic acid should be prevented in the fluid, because the sulphuric acid which is here introduced into the fluid by the reagent can be more easily and quickly removed than acetic acid. The application of sulphate of copper for distinguishing grape sugar and milk sugar from gum-cane sugar, and analogous bodies, is, of course, well-known; but I may mention that the *alkaline solution of copper* as a reagent demands great care, because many substances effect a reduction and separation of the suboxide of copper, like grape sugar or milk sugar; on the contrary, other substances have not this reaction.

9. *Chloride of platinum*, and

10. *Bichloride of mercury.*—These salts serve for the detection and separation of organic bases. (For the same object, under certain conditions, infusion of galls, nitro-picric acid, and sometimes sulpho-cyanuret of potassium are employed.)

11. *Carbonic acid, metallic oxides insoluble in water, carbonate of lead, carbonate of silver, carbonate of copper, and basic carbonate of lead.* are often employed for the separation of bodies. *Carbonate of zinc* and *carbonate of cadmium* are seldom serviceable. Many substances expel the carbonic acid from the carbonates, and form compounds partly soluble and partly insoluble; other substances drive off the carbonic acid quite as little at the boiling heat of water as at ordinary temperatures, whilst some other bodies are able to expel the carbonic acid in the heat, but certainly not in the cold. When, therefore, one or the other of the metallic carbonates named are brought into a solution of different bodies, compounds result partly soluble and partly insoluble, while a part of the organic substance remains dissolved in a free state. Many of the dissolved compounds are precipitated by alcohol from their watery solutions, and others are not, whereby a further separation is rendered possible.

12. *Bisulphites of potash, soda, and ammonia.*—These salts are prepared in solution, as concentrated as possible, by conducting sulphurous acid into concentrated solutions of the corresponding carbonates. They are partly employed to produce, with certain substances, compounds which are easily separated from the other constituents, which are not capable of combining with alkaline bisulphites. This is the case in the separation of the aldehydes from indifferent bodies which possess equal solubility in various fluids with the aldehydes. They are partly used with the co-operation of heat to change individual substances, whilst others remain thereby unaltered. Many substances which possess the same solubility as others, by this change lose their solubility in a fluid, so that the bodies remaining unchanged may now be readily separated from the unaltered ones.

It is necessary, when changes are produced by the action of the materials which afford a solid body by separation from a fluid, to always observe whether the separated substance contains or not sulphurous acid and an alkali. By this it may be concluded whether an insoluble compound, with alkaline bisulphites, results or not. As Knop has shown, many bodies break up by the action of alkaline bisulphites in the heat in a manner analogous to the action of free alkalies and acids in the heat. By this capacity to produce decomposition products, the alkaline bisulphites are quite as useful in investigations as by their capacity to form with many bodies alkaline salts under the expulsion of sulphurous acid, whose oxidation by the oxygen of the air is prevented by the presence of sulphurous acid, as Knop has observed with gallic acid and analogous bodies.

13. *Hypochlorite of lime.*—The chlorinated lime is employed as watery solution which has been separated from the undissolved hydrate of lime by filtration through clean asbestos. With many organic substances it produces characteristic colorations, which are often so very intense that a small quantity of a body can be recognized thereby in the presence of other substances. Lichens contain peculiar crystalline materials, some of which

are remarkably colored by chlorinated lime. With many bodies chlorinated lime produces no coloration. The chloride of calcium admixed has no influence in these reactions.

14. *Bichromate of potash.*—Bichromate of potash acts on many organic substances at ordinary temperatures, on others only at a boiling heat. Many bodies undergo no change at higher temperatures with this salt. By this unequal behaviour of bodies to this oxidizing salt, it is suitable for the detection of many substances. Either changes of color only, or also the separation of precipitates, are thereby observed, which latter consist frequently of a combination of oxide of chromium with a newly-formed product of oxidation. Frequently, peculiar odorous volatile oxidation products are formed, which are readily detected by reagents. When the salt does not act on a solution of one or more bodies even at the boiling heat of water, a little sulphuric acid is then added, by which an oxidation is effected, except in a few cases. Only a few bodies withstand the action of chromic acid, which is rendered free by the addition of sulphuric acid. The experiment with bichromate of potash, as well as with chromic acid, is best undertaken in a retort, or a flask connected with a refrigeratory apparatus and a receiver, to intercept the bodies which are volatile. Salicylic acid, kinone, &c., can be thus easily detected in the distillate. Substances which—as, for example, limonine—withstand the action of chromic acid even at high temperatures, are easily isolated from all other accompanying constituents, which thereby undergo decompositions.

15. *Caustic alkalies, the hydrates of potash and soda, as well as baryta,* are often very serviceable as reagents, partly in the form of an aqueous, and partly in the solid condition. Substances are dissolved by a solution of an alkaline hydrate which are insoluble in a free state in water or spirit; while other substances, insoluble, *per se,* but dissolved in the form of a compound, are separated and precipitated by the alkaline solution. Potash, soda, and baryta, effect changes by bodies being heated in their solutions, which often afford conclusions on the nature of the bodies, and quite as often draw attention to the existence of a body which otherwise had remained unobserved. Ammonia, methylamine, and similar bases, are often thereby set free from nitrogenous bodies, sometimes affording a decomposition product which, with the alkali, forms an insoluble compound which separates. This takes place more frequently with baryta, than with soda, or potash. Indeed, often no such insoluble compounds result, but a soluble salt of a decomposition product is formed, which is, *per se,* insoluble in water, so that only after saturation with an acid a decomposition product is separated. As organic substances in contact with the air more readily take up its oxygen in the presence of strong bases than happens without the agency of these bases, it is necessary to exclude the air when the action of alkalies on organic substances is to be observed. Consequently, the bodies are heated with alkalies in vessels which are filled with

hydrogen gas, in the manner explained in the treatment of certain bodies with baryta (page 42.)

The disposition of many organic substances to oxydize with oxygen in contact with alkalies, can likewise be used for the detection of bodies. In these processes of oxidation changes of color generally appear which are not easily overlooked,

16. *Ammonia.*—In its method of action, ammonia is closely allied to the bases above mentioned. In many cases it possesses a preference over them, in so far as an excess of it can be easily removed. Its action is generally less energetic than that of the fixed alkalies and baryta. Ammonia frequently acts in a peculiar way on organic substances, for many organic substances combine therewith under the absorption of oxygen and the separation of water, and produce sometimes brilliantly colored compounds. In contact with many compounds, ammonia produces immediately characteristic colorations. The treatment of dry substances with dry ammoniacal gas, sometimes at ordinary and sometimes at higher temperatures, serves frequently for the detection of bodies which would otherwise remain unobserved, and for the recognition of bodies in other respects similar.

17. *Nitric acid.*—The acid acts in a concentrated condition very vehemently on almost all organic bodies. Their oxidation products, or substitution products, which contain NO_4 in the place of hydrogen, are thus produced. The body often splits up, and the products of this decomposition then undergo further changes. By the action of nitric acid many bodies assume very intense characteristic colorations, others do not; so that this acid can be used by this property for the recognition of bodies in mixtures with others. Nitric acid mixed with sulphuric is particularly suitable for the development of nitro-compounds.

18. *Sulphuric acid* is employed in a diluted as well as a concentrated condition. The heated dilute acid splits up many bodies into decomposition products, although in this respect hydrochloric acid is much to be preferred. But it may be more readily and quickly separated from a liquid than hydrochloric acid, which in many cases demands care. In a moderately concentrated state it precipitates many forms of tannin from concentrated aqueous solutions, particularly when no acetic acid is present. It gives crystallizable salts with many organic bases, which, with the exception of the salts of methylamine, are soluble in alcohol. The dilute acids often effect in the heat, with some organic substances, an absorbtion of water, or rather of its elements; with others, an expulsion of hydrogen and oxygen in equal equivalents. In this respect its action has much resemblance to the action of alkalies.

The concentrated acid dissolves many organic substances without exercising any influence on their composition. When the substance is insoluble in water, it is often precipitated unchanged from such solutions by

water. Sometimes the solutions even of colorless bodies are strongly colored. Generally, the color of the solution appears red; more seldom, violet or blue. The yellow or brownish-yellow color is quite as frequent as the red. By the addition of water a more or less complete decolorization then generally ensues, with or without the formation of a precipitate. Sometimes, by the solution of a substance, a so-called copulated sulphuric acid is produced, which is found when the solution, diluted with water, is mixed with carbonate of baryta, lime, or lead, and the sulphuric acid salt, insoluble in water, separated by filtration from the fluid, which is then evaporated, whereby the salt of the copulated acid is left behind.

19. *Hydrochloric acid.*—The concentrated acid precipitates many organic substances from their aqueous solutions, but the precipitation is not generally so complete as that with sulphuric acid. More of the substance to be precipitated remains dissolved in the hydrochloric acid solution than is the case with the use of sulphuric acid. Acetic acid prevents generally the precipitation more or less, and sometimes entirely. The tannic acid of galls, and other analogous bodies, may be precipitated by hydrochloric acid. The dilute hydrochloric acid, at the boiling heat of water, splits up bodies, and in this respect it is not surpassed by any other reagent. Decompositions of this kind are most suitably undertaken in an atmosphere of carbonic acid. A more thorough decomposition, as happens so readily with sulphuric acid at the margin of the liquid, is not to be feared with hydrochloric acid. Hydrochloric acid affords with these decomposition products very little occasion for the formation of bye-products. Through the separation of a difficultly soluble or insoluble decomposition product, and by the peculiar color of many such products, the means are given frequently to recognize and to direct attention to a body. Concentrated hydrochloric acid, as well as hydrochloric acid gas, like concentrated sulphuric acid, produce often a conspicuous coloration of bodies, which sometimes disappears on the addition of water, but sometimes is only slightly changed thereby, and in a few cases undergoes no alteration at all. Hydrochloric acid gas may be employed for the determination of the atomic weights of substances with which it combines; as, for example, organic bases and many hydrocarbons, of which some give therewith a crystalline, and others a volatile compound. In the latter case, hydrochloric acid may be employed for the separation of several such indifferent bodies. Hydrochloric acid is consequently the most generally applicable means for the recognition and separation of organic materials.

Before I pass to another reagent, I will only just remark, that different organic substances which are split up by hydrochloric acid require an unequally long time for their decomposition, so that, by a gentle heat and a sufficiently diluted acid, one of the compounds is often entirely decomposed before the decomposition of the second has begun. In this way, consequently, it is frequently possible to recognize two substances mixed with

one another whose solution could easily have been regarded as the solution of a single substance.

20. *Peroxide of lead, and peroxide of manganese.*—Both these superoxides, in a finely divided condition, frequently produce an oxidation of one or the other constituent in the heated watery solutions of substances, while some bodies are not thereby attacked. A few organic compounds withstand this oxidizing agent after the addition of dilute sulphuric acid. Volatile bodies are often thereby formed, as formic acid, kinone, &c., and frequently characteristically-colored oxidation products; as, for example, with strychnine. The formation of colored oxidation products from many organic bases, which are produced by the action of peroxide of lead and sulphuric acid, depends, with the majority of these substances, upon an illusion. Quinetine, cinchonetine, morphetine, &c., result, by the action of sulphuric acid and peroxide of lead, from the bases concerned, only when the sulphuric acid or the peroxide of lead is contaminated with nitric acid. By the employment of pure reagents other decompositions are produced.

21. *Chlorine, bromine, and iodine.*—These three elements produce, partly by the indirect oxidation of the substance in the watery solution in which they are introduced, and partly by the substitution of hydrogen which they call forth, characteristic appearances of color, or precipitations of insoluble oxidation or substitution products; consequently, they serve often for the detection of substances in mixtures.

22. *Gelatin.*—Solution of gelatin is employed for the precipitation of the different forms of tannin. A pure solution of gelatin is prepared by precipitating a solution of gelatin, to which a little hydrochloric acid has been added, with alcohol, washing the precipitate with spirit, and dissolving the washed gelatin in water.

23. *Infusion of galls* serves for the precipitation of organic bases, as well as for throwing down some albuminous substances from their solutions.

The employment of reagents will never lead to a complete knowledge of the composition of a vegetable substance, because, from the similar behaviour towards some reagents of a body discovered with one already known, no conclusion can be drawn on their identity. Reagents are serviceable for directing attention to the presence of substances, and reagents should show us the way of separating bodies which exist in a mixed state. In the second section it has been explained how we are to proceed with different decoctions and infusions of a material under examination, to separate up to a certain point the constituents from one another. Thereby it was necessary to speak of the application of some reagents. The description of the method of separating mixtures was often interrupted, and it was there stated that the further examination must be continued with the aid of reagents. If we had described in every case the method to its termination, a numberless quantity of repetitions would have been un-

avoidable. Besides, that which has been indicated above concerning the individual reagents, clearly shows in what manner and to what purpose each reagent shall be used, where in previous paragraphs it has been only briefly pointed out that reagents should be used for the further investigation. Assuming that by treatment of the precipitate with acetic acid, which sugar of lead produced in the watery decoction of the material under examination, we have the precipitate separated into a part soluble and a part insoluble in acetic acid, the part soluble in acetic acid precipitated by subacetate of lead into two portions, because by subacetate of lead a precipitate results when the fluid still reacts acid, while a second precipitate makes its appearance when the acid fluid is neutralized by the addition of subacetate of lead: assuming that by treatment of both lead salts with alcohol, we have separated them into a part soluble and a part insoluble in alcohol, and thus obtained four portions of lead salts of the precipitate from the part soluble in acetic acid produced by sugar of lead in the watery decoction of the material under examination; assuming that we have decomposed the part of this precipitate insoluble in acetic acid under water by sulphuretted hydrogen, the fluid filtered from the sulphuret of lead, freed from the excess of sulphuretted hydrogen, and thrown down ten lead salts by fractional precipitation with sugar of lead, we have prepared in this way fourteen lead salts from the single precipitate thrown down by sugar of lead in the watery decoction of the material under examination. By the decomposition of these lead salts with sulphuretted hydrogen, we have fourteen aqueous solutions, which are now to be tested with reagents. It is self-evident that certain reagents are not here required to be employed, because no representative can be contained in these fluids of the class of bodies for which they could be used with results. We have found in the precipitate produced by sugar of lead partly inorganic and partly organic acids combined with lead, no indifferent carbohydrates and no bases, because their precipitation is prevented by the acetic acid rendered free. The vegetable acids existing generally as malic acid, citric acid, tartaric acid, fumaric or aconitic acid, the tannic acids, the acids corresponding to gallic acid, substances which are so widely spread in the vegetable kingdom, are contained in this precipitate, by the investigation of the bark, the leaves, the stems, and the flowers of plants. Coloring matters, often formed by the oxidation of the various forms of tannin or their splitting up, are produced from colorless bodies. Gelatinous bodies of the class of pectine compounds are frequently present in this precipitate. Coloring matters and pectine bodies, by the decomposition of the lead compound with sulphuretted hydrogen, are often entirely retained in the sulphuret of lead, partly because sulphuret of lead acts analogous to animal charcoal, and partly because they were present in the watery decoction in the form of soluble salts. By precipitation with sugar of lead the base of the soluble salt is separated as an acetate, the acid precipitated with the oxide of lead, and retained by the sulphuret of

(To be continued.)

Varieties.

Waterproof Glue.—Fine shreds of india rubber, dissolved in warm copal varnish, make a waterproof cement for wood and leather. Take glue, 12 ounces, and water sufficient to dissolve it; then add 3 ounces of resin, and melt them together, after which add 4 parts of turpentine. This should be done in a water bath, or in a carpenter's glue-pot. This also makes a very good waterproof glue.—*Lond. Chem. News.*

New Substitute for Silver.—M. Traluc, of Nismes, has recently proposed as a substitute for silver for various uses, a white alloy which has the property of resisting vegetable acids. It is formed of 375 parts of Banca tin; 55 nickel; 50 regulus of antimony; 20 bismuth. One-third of the tin is put in a crucible of the proper dimensions with the nickel, antimony, and bismuth; upon this first layer is put another third of the tin, and then a thickness of an inch and a half of wood-charcoal; the crucible is then to be covered and brought to a white-heat; by means of an iron rod also heated to redness it must be ascertained that the nickel is fused, and the antimony reduced; the remainder of the tin is then introduced through the charcoal, and the mass stirred until the metals are thoroughly combined; it may then be cast in ingots or otherwise.—*Cosmos.*

Durability of Hemlock. By T. Guilford Smith, C. E. M. and B. M. Railroad.—In laying pipes to supply a water station on the top of the Broad Mountain, in Schuylkill County, on the line of the Mahanoy and Broad Mountain Railroad, we found it convenient to make use of the dam, and to follow the ditch originally made by the Danville and Pottsville Railroad Company, 32 years ago.

To our suprise, we found the hemlock trees which had been bored for pipes, in a perfect state of preservation, wherever submerged or surrounded by moist earth. The bark was still adhering, and the sapwood presented that rosy hue seen in freshly felled hemlock. Wherever, on the contrary, the surroundings were dry, the timber was decayed.

The pipes varied in depth beneath the surface of the ground from 1½ to 2 feet. They were in excellent condition for over 1000 feet in a continuous line.—*Journal of the Franklin Institute.*

AMERICAN PHARMACEUTICAL ASSOCIATION.—NOTICE.

The adjourned meeting of the Association, which was to have been held last year at St. Louis, and postponed in consequence of the disturbed condition of the country, will be held at the City of Philadelphia, on Wednesday the 27th of August next, at 3 o'clock, P. M.

It is most earnestly recommended to *all* the members to keep in view the important interests of the Association—to the several Committees, and especially those members and others appointed at the meeting held at New York, in 1860, to whom was referred the investigation of special subjects, to be ready to make their reports at the coming session of the Association.

The objects of the Association and the conditions of membership are explained in the *first and second articles* of the Constitution as published in the Proceedings of 1860, and in the several Pharmaceutical Journals.

H. T. KIERSTED, *President.*

New York, April 12th, 1862.

Editorial Department.

NEXT MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.—At the meeting of the Board of Trustees of the Philadelphia College of Pharmacy, in May last, the following resolution was passed:

"Resolved, That a committee of five be appointed to make arrangements for the meeting of the American Pharmaceutical Association in August next, and that they be requested to correspond with the Pharmaceutists of neighboring cities and towns in Pennsylvania, New Jersey, Delaware and Maryland, inviting their attendance, and to advertise the meeting in the papers of this city, and report to a future meeting of this Board the probable expenses attending the Convention."

The following committee was appointed:

WM. PROCTER, Jr., 500 South 9th street,
EDWARD PARRISH, 800 Arch street,
A. B. TAYLOR, 1015 Chestnut street,
EVAN T. ELLIS, 724 Market street,
JAMES T. SHINN, Broad and Spruce street.

From the Minutes, A. B. TAYLOR, Secretary.

The Committee of Arrangements are about to engage in the duties of their appointment, and the residence of each member of the committee has been indicated in order that strangers who may come to this city with the view of attending the meeting, may know where to apply for information, and they are invited to do so freely to either of the committee.

It has been determined to convene the meeting in the College Hall,

Filbert street above 7th, and as our readers will notice in the call of the President at page 378, it will occur at 3 o'clock, on the afternoon of Wednesday the 27th of August.

This location is central and convenient to the principal hotels, being about three squares from the Continental, 9th and Chestnut streets. All persons intending to become members by the action of the Association at its first meeting, are each requested to make application to the Chairman of the Executive Committee, (W. Procter, Jr., as above,) and get a copy of the Constitution with accompanying blanks for signature, either before hand or when they arrive in Philadelphia. We are authorized to say that arrangements will be made for the exhibition of specimens at the meeting, and all persons intending to forward specimens should direct their packages (freight paid) to the Philadelphia College of Pharmacy, care of Edward Parrish, 800 Arch Street, Philadelphia.

Report of the Revising Committee on the British Pharmacopœia.—This Committee were appointed by the "General Medical Council," a body holding their authority directly from Parliament. This Committee commenced their labors in November, 1858, and made a partial report, which was published at page 430, vol. xxxii., (1860) of this Journal. They now announce the completion of their labors so far that the manuscript copy of the British Pharmacopœia is ready for the printer. The work contains 322 articles of the materia medica list, 380 processes, galenical and chemical, and 49 substances in an appended list. To give an idea of the labor expended in producing this work, the report says: "The London sub-committee met 149 times; that of Edinburgh 105 times; that of Dublin 131 times; and the general conferences of the three committees held in London and Edinburgh met ten times, whilst a sub-committee on the chemistry of the work met in Dublin eighteen times. The weights adopted for the work are the avoirdupois, pound and ounce; the latter divided precisely as the troy ounce into 8 drachms, 24 scruples, and 480 grains, which reduces the grain about 1-11th in value. The British Pharmaceutists may well rejoice in being relieved by this change from the onerous task of unceasingly bearing in mind that the weights they employ in buying and selling are *not* those they must use in compounding medicines; and this change is to be brought about without the alteration of a single term in their metrological nomenclature. We have always been favorable to the adoption of this system in the U. S. Pharmacopœia, on the ground both of its expediency and real merit, as a measure giving uniformity of action among apothecaries, many of whom pay no regard to the use of troy weights in compounding quantities greater than half an ounce, because they have only avoirdupois weights.

The delay which now prevents the publication of the work has reference to the copyright, which required the action of the general council

and it is proposed to obtain an act of Parliament rendering the use of the new Pharmacopœia obligatory on all engaged in the preparation of medicines, for regular practitioners, within the British Empire.

In regard to the numerous changes in the strength of preparations consequent on a fusion of the three British Pharmacopœias, the committee deem it necessary "to publish a warning to all pharmaceutic chemists and druggists, that, on the publication of the Pharmacopœia it will be impossible for them to discharge their duties to the public safety unless they destroy or alter all pharmaceutic preparations they may have in store which have been made according to present formulæ, and the strength of which is altered in the new Pharmacopœia. And a further caution must be given to all medical practitioners, that it will be hazardous for them to exercise their profession without making themselves acquainted with all changes made in the strength of officinal preparations, which changes will be carefully noticed under each article."

It is greatly to be desired that this work should be published early, that our own revised Pharmacopœia, which is rapidly being fitted for the press, may be benefitted by any valuable suggestions it may offer, and may be modified in those instances where important preparations of the same name may vary but slightly from that authority.

Prices of Drugs and Chemicals at the South.—The following letter from Dr. Bache, Surgeon of General Butler's Expedition, to the Editor, was received just as we were going to press, and is inserted here as a curious matter of history. It is presumed that the prices mentioned have reference to Confederate notes, and not to U. S. Currency.

Head Quarters, Department of Gulf, June 12th, 1862.

My dear Sir,—You have probably heard many wild stories concerning the prices of drugs lately sold in this city (New Orleans.) As an interesting piece of information, I have taken care to get at the truth, and enclose the statement to you:

Chloroform	per pound	24.00 dollars.
Opium	" "	35.00 "
Calomel	" "	6.00 "
Mass Pil. Hydrargyri,	per pound,	6.00 "
Magnesiæ Sulphas	"	0.75 "
Ether	" "	2.50 "
Alum	" "	0·75 "
Potassii Iodidum	"	20.00 "
Tannin	"	40 to 50.00 "
Sulphate of quinia	per ounce	10.00 "
Sulphate of morphia	"	16.00 "
Castor oil	per gallon	12.00 "

One apothecary told me he is sure there was plenty of quinia sulph. in the Confederacy, about 4500 ounces. That he knew of one person who recently had about 1000 ounces.

The prices above, refer to the period before our arrival.

Yours truly, T. H. Bache.

MERCANTILE LIBRARY.—We are gratified to acknowledge the following liberal invitation from the Mercantile Library Company:

Philadelphia, June 10th, 1862.

To the Proprietors of the American Journal of Pharmacy.

Gentlemen,—Enclosed you will receive with the compliments of the President and Directors of the Mercantile Library Company, a ticket for the editorial corps connected with your office, extending to the bearer of the ticket the freedom of the library rooms for the year 1862, according to a resolution passed by the Board.

J. H. WILSON, JOHN D. WATSON, T. MORRIS PEROT, Committee.

Baltimore, June 20th, 1862.

Editor of the American Journal of Pharmacy.

Sir,—At a meeting of the Maryland College of Pharmacy, held June 5th, the following gentlemen were elected delegates to the American Pharmaceutical Association, which meets in Philadelphia August 27th:

J. J. Thomsen, J. Faris Moore, N. Hynson Jennings,
Jonas Winter, J. Brown Baxley.

Respectfully, J. JACOB SMITH,
Secretary of the Maryland College of Pharmacy.

ALCOHOLIC TINCTURES.—The following query has been received:

Philadelphia, June 14th.

To the Editor of the American Journal of Pharmacy:

Sir,—I have sought in vain for some information as to whether alcoholic tinctures are deteriorated by the precipitation which takes place in some of them after standing for several years. Will you please inform me through the Journal how it is, and if deteriorated, whether to any serious extent?

Respectfully, APPRENTICE.

In reply it may be stated that many of these preparations do deteriorate by age. The causes of injury are various; the reaction of incompatible ingredients which find themselves in the presence of each other through the agency of the menstruum, and gradually produce a new arrangement of proximate constituents. The action of light as a chemical agency is very fruitful of changes, and when the aid of atmospheric oxygen is added, we have the chief cause of the deterioration of tinctures. It is well known that diluted alcohol becomes acetic by exposure to the air, and Mr. Bastick (see American Journal of Pharmacy, vol. xx. page 47,) has remarked on this tendency in tinctures. Tannin reacts on alkaloids, on standing, in the cinchona tinctures, (see Maisch, same work, May 1861, page 194), and we are all familiar with the destruction of the tannic acid in astringent tinctures of the kino class, resulting in a gelatinous apothemic precipitate. Messrs. De la Rue and Müller have (see same work, July, 1858, pages 366 and 442,) examined the deposit in tincture of rhubarb, and,

found it to consist chiefly of erythroretin, crysophanic acid, and other active constituents of that drug. It may be inferred from what is known, that tinctures keep best carefully closed, and in the dark. Our space will not admit of further comment.

The Tax Bill for Internal Revenue.—This measure, we learn on going to press, has become a law, and the 106th section bearing on apothecaries appears to have passed very much as printed in our May number at page 282, as recommended by the College Committee, except the last clause in parenthesis, which was omitted. We have been unable, by diligent inquiry, to get information on many points of interest in connection with the operation of the law, as to when it will *practically* go into effect, how it will operate on stock on hand, etc., but we presume the government will take the proper measures to publish the whole law in a clear and explicit form, so that all may understand their relations with it.

Ung. Cadmii Iodidi.—Mr. Charles Heinitsh, of Lancaster, says, that the ointment of iodide of cadmium is getting considerably into use in that city as a substitute for the officinal Ung. Potassii Iodidi, because it does not discolor the skin. He recommends the following formula:—

R.	Cadmii Iodidi	℈j.
	Adepis	℥j.
	Ol. Neroli	gtt. x.
	Ætheris	gtt. xx.

Rub the iodide with the ether, till in fine powder, then add the lard and oil, and thoroughly mix them,

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American Medical Association.—The annual meeting of this body, postponed last year on account of the rebellion, is further postponed until June, 1863, by order of the Committee of Arrangements, dated Chicago, March 20th, 1862, as noticed in the *Chicago Medical Examiner*.

Erratum.—In our last number, page 241, line 18 from the top, the printer made us use the word "Anatomy." The intelligent reader would at once from the context discover that it should be "Antimony."

First Outlines of a Dictionary of the Solubilities of Chemical Substances. By Frank H. Storer.

The first eight pages of a work with this title, has been sent to us. From the range of words as exhibited in the specimen, the work, if carried out in the same way, will be very comprehensive. Such a work, if correct, will be exceedingly valuable, but much will depend on the care of the author in sifting authorities, as in no character of chemical substances do writers more often disagree than in that of solubility. We observe a great

many substances simply named without any reference to solubility. This is probably as a reminder for a future edition. We would encourage the author to proceed with the work, and to be as explicit as possible in stating solubilities as to proportions of solvent, temperatures and time, inasmuch as some very soluble bodies dissolve very slowly.

On the Economic Applications of Sea Weed. By Edward C. C. Stanford, F. C. S. 15 pp. large octavo. (Reprinted from the Journal of the Society of Arts, Feb. 1862.)

The receipt of the above pamphlet from the author is hereby acknowledged, and we hope to make some extracts of interest to our readers in a future number of this journal. The most important feature of this paper is a new way of treating sea weed to get kelp, by which various collateral products, heretofore lost, can be obtained.

The Industrial Chemist. Devoted to the interests of practical Science, Arts, Manufactures, Agriculture and Industry in general. Edited by Professor H. Dussauce, of New Lebanon, New York. Published monthly, by John Hillyer, 249 Pearl St. New York. Price $1.50 per annum. Vol. 1, No. 1, pp. 16,—large quarto.

This work is intended as a vehicle for conveying information in regard to Science and Art to its readers, and judged by the variety presented in the first number, the prospect is a fair one. We hope the Editor, as far as possible, will adopt the honest and fair practice of crediting his selected articles to the Journals or authorities whence obtained, not only in justice to writers, but greatly to the satisfaction of investigators who may wish to consult the originals. As an instance of this want of care, the Journal and Transactions of the Maryland College of Pharmacy, in April, 1862, republished Dr. Pile's letter to the Editor of this Journal, from our January number, without credit, appearing to all intents and purposes as addressed to the Editor of the Maryland Journal. The Journal of Materia Medica, for May, copies it, and credits the Maryland Journal, and thus the original source of the article remains unknown to its readers.

On Bandaging and other operations of Minor Surgery. By F. W. Sargent, M. D., Member of the College of Physicians of Philadelphia, &c. New edition, with an additional chapter on Military Surgery by W. F. Atlee, M. D., and one hundred and eighty-seven illustrations. Philadelphia, Blanchard & Lea, 1862. pp. 383 octavo.

The volume of which the above is the title page, is not intended for the Pharmaceutist, but, like many other medical and surgical works, there are many hints to be gleaned from it which may contribute to extend his usefulness on many legitimate occasions in his intercourse with the public.

The second chapter is devoted to "surgical dressings," which describes

"lint, charpie, cotton, compresses, sponge-tent, adhesive plasters, collodion, poultices, lotions, cerates, ointments, liniments, and sponge." Of lint the author says, "The French surgeons employ an admirable sort of lint, which they term 'Charpie.'" It is now very generally used in this city, and, indeed, throughout the country when it can be procured. It is thus made:—"Linen of a coarse or fine texture, according to circumstances, is cut into small pieces a few inches square, and its tissue completely unravelled, thread by thread. The coarse kind of charpie may be made of old table cloths; the finer sort, of a lighter material. Velpeau gives a decided preference to charpie made of old linen, as being much more absorbent, and much less irritating than that made of the new fabric."

The remarks on poultices, bandages, disinfectants, fumigations, topical bleeding, including, cupping, leeching rubefacients, vesicants, moxas, and other cauteries, the means of stopping hæmorrhage, injections, the removal of solid bodies, the air passages, and the production of anæsthesia for the relief of pain, are well worthy of study by the apothecary, who, in his relations to the public and to physicians, is often called on for information embraced within these subjects, and we believe Dr. Sargent's book will prove a useful addition to the library of the pharmaceutist, who aims at accomplishing himself in all the details of his profession.

Report of the Surgeon General of the Commonwealth of Pennsylvania, for the year 1861, has been received. It is a small pamphlet of 11 pages, and gives an account of the organization of the State Medical Corps attached to the regiments put in the field or camp last year.

Retrospect of Practical Medicine and Surgery, being a Half-yearly Journal, containing a retrospective view of every discovery and practical improvement in the medical sciences. Edited by W. Braithwaite, M. D., and J. Braithwaite, M. D. Part xliv. January, 1862. Uniform American edition, New York, published by W. A. Townsend, 1862. pp. 382, octavo.

Obituary.—Pierre Berthier, the oldest of the French Mineralogists, died of paralysis on the 29th of August, 1861, aged 89 years. He was born at Nemours, July 3d, 1772, entered the Polytechnic School, and afterwards the School of Mines, which he left in 1801. His early and celebrated work, "Traité des Essais par la Voie Sèche," gave him reputation, and proved of great service to metallurgy and analysis, and led to his appointment as a Professor in the School of Mines, a position which he retained until 1845.

Joubard.—This noted advocate of the rights of intellectual property died at Brussels, Oct. 26, 1861, aged 79 years. He was born at Baissey, a village in the department of Haute-Warne, in 1782. He was Director of the *Musée de l'Industrie*, created after Belgium separated from Holland, 1830. —(*J. Nickles, Corr. Sill. Jour.*)